

**UTAR LOST AND FOUND MANAGEMENT
SYSTEM**

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UTAR LOST AND FOUND MANAGEMENT SYSTEM

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**A project report submitted in partial fulfilment of the
requirements for the award of Bachelor of Science
(Honours) Software Engineering**

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September 2020

DECLARATION

I hereby declare that this project report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree or award at UTAR or other institutions.

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ABSTRACT

People lose things occasionally. Scattered and unorganized lost and found information can have a significant impact on the possibility to get back the lost items. The information cannot reach the rightful owner if they are not well-managed.

Hence, the UTAR lost and found management system project was implemented to provide a standardized, centralized way to handle lost and found items in UTAR. The project objectives are to analyze the existing lost and found problems in UTAR as well as the features of similar systems and develop a cross-platform lost and found management system to improve the efficiency and effectiveness in managing and organizing the lost and found items in UTAR.

The result showed the user preference between web application and mobile application are almost equal based on the survey conducted. Thus, a cross-platform application was developed so users can access through a web browser or mobile application. The basic functionality of the application includes viewing, reporting and updating lost and found items, submitting claims, selling and bidding expired items. MySQL database was used as the system database. The framework of the web application is Laravel while the mobile application is React Native. The adopted methodology in this project is prototyping methodology. Unit testing, integration testing and user acceptance testing were conducted to evaluate the system. Based on the user acceptance testing conducted, most of the respondents are satisfied with the function of the system. Some respondents suggested to improve the user interface of mobile application so it can be more attractive for users.

TABLE OF CONTENTS

DECLARATION	iii
APPROVAL FOR SUBMISSION	iv
ABSTRACT	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	xi
LIST OF FIGURES	xiv
LIST OF SYMBOLS / ABBREVIATIONS	xviii
LIST OF APPENDICES	xix

CHAPTER

1	INTRODUCTION	1
	1.1 Introduction	1
	1.2 Problem Statement	1
	1.3 Project Objectives	4
	1.4 Proposed Solution	4
	1.5 Project Approach	6
	1.6 Scope	7
	1.6.1 System Scope	7
	1.6.2 Project Modules	8
2	LITERATURE REVIEW	11
	2.1 Introduction	11
	2.2 Software Development Methodologies	11
	2.2.1 Waterfall Methodology	11
	2.2.2 Agile Methodology	13
	2.2.3 Comparison of Waterfall and Agile	16
	2.2.4 Prototyping Methodology	17

	2.2.5	Conclusion	18
2.3		Existing Lost and Found Systems	19
	2.3.1	Crowdfind	19
	2.3.2	RepoApp	21
	2.3.3	FidoFinder	23
	2.3.4	Comparison of Crowdfind, RepoApp and FidoFinder	25
	2.3.5	Conclusion	25
2.4		Auction Models	26
	2.4.1	Open-Bid Auction	27
	2.4.3	Sealed-Bid Auction	28
	2.4.4	Conclusion	29
3		METHODOLOGY AND WORK PLAN	31
	3.1	Introduction	31
	3.2	Project Planning	31
		3.2.1 Work Breakdown Structure (WBS)	32
		3.2.2 Gantt Chart	32
		3.2.3 Survey Analysis	33
		3.2.4 Development Tools	42
		3.2.5 Quick Design	43
	3.3	Iteration Process	44
		3.3.1 First Iteration	44
		3.3.2 Second Iteration	44
		3.3.3 Third Iteration	45
	3.4	Development and Testing	45
		3.4.1 Unit Testing	46
		3.4.2 Integration Testing	46
		3.4.3 User Acceptance Testing	46
	3.5	Deployment	46
4		PROJECT SPECIFICATION	47
	4.1	Introduction	47

4.2	Functional Requirement	47
4.3	Use Case Diagram	52
4.4	Use Case Description	53
5	SYSTEM DESIGN	72
5.1	Introduction	72
5.2	System Architecture Design	72
5.3	User Interface Navigation Design	73
5.4	Database Design	74
	5.4.1 Entity Relationship Diagram	74
	5.4.2 Data Dictionary	75
5.5	Activity Diagram	81
6	SYSTEM IMPLEMENTATION	96
6.1	Introduction	96
6.2	Route Design	96
6.3	Role-Based Access Control Diagram	102
6.4	Results and Discussions	103
	6.4.1 Register	103
	6.4.2 Login	105
	6.4.3 Announcement	107
	6.4.4 Found Item	110
	6.4.5 Claim Item	112
	6.4.6 Lost Case	115
	6.4.7 Item for Sale	117
	6.4.8 Profile	120
	6.4.9 Staff Account	122
	6.4.10 Item Category	123
7	SYSTEM TESTING	125
7.1	Introduction	125
7.2	Unit Testing	125
7.3	Integration Testing	155

7.4	User Acceptance Testing	161
8	CONCLUSIONS AND RECOMMENDATIONS	163
8.1	Conclusions	163
8.2	Recommendations for Future Work	163
	REFERENCES	165
	APPENDICES	167

LIST OF TABLES

Table 2.1: Average scores for each factor, for both Kanban and Scrum (Lei, et al., 2015)	15
Table 2.2: Defect Analysis for Waterfall and Agile Projects (Poe and Seeman, 2019)	16
Table 2.3: Comparison Matrix of Software Development Methodologies	18
Table 2.4: Comparison Matrix of Crowdfind, RepoApp and FidoFinder	25
Table 2.5: Comparison Matrix of Open-Bid Auction and Sealed-Bid Auction	29
Table 3.1: Main problems encountered by students in accessing information	35
Table 3.2: Main Expected Features in Lost and Found Application	40
Table 4.1: Register Use Case	53
Table 4.2: Login Use Case	54
Table 4.3: View Found Item Use Case	55
Table 4.4: View Lost Case Use Case	56
Table 4.5: View Item for Sale Use Case	57
Table 4.6: View Announcement Use Case	58
Table 4.7: Claim Item Use Case	59
Table 4.8: Report Lost Item Use Case	59
Table 4.9: Bid Selling Item Use Case	60
Table 4.10: Manage Found Item Use Case	61
Table 4.11: Manage Claim Use Case	63
Table 4.12: Manage Item for Sale Use Case	64
Table 4.13: Manage Announcement Use Case	66

Table 4.14: Manage Staff Admin Account Use Case	67
Table 4.15: Customize Item Category Use Case	69
Table 5.1: Description of Entity Relationship Diagram	75
Table 5.2: Data Dictionary for ‘users’ Entity	75
Table 5.3: Data Dictionary for ‘found_items’ Entity	76
Table 5.4: Data Dictionary for ‘claims’ Entity	77
Table 5.5: Data Dictionary for ‘lost_items Entity	77
Table 5.6: Data Dictionary for ‘selling_items’ Entity	78
Table 5.7: Data Dictionary for ‘bids’ Entity	78
Table 5.8: Data Dictionary for ‘announcements Entity	79
Table 5.9: Data Dictionary for ‘attachments’ Entity	79
Table 5.10: Data Dictionary for ‘settings Entity	80
Table 5.11: Data Dictionary for ‘categories Entity	80
Table 6.1: Route Design for ‘found_items’	96
Table 6.2: Route Design for ‘lost_items’	97
Table 6.3: Route Design for ‘selling_items’	98
Table 6.4: Route Design for ‘bids’	99
Table 6.5: Route Design for ‘claims’	99
Table 6.6: Route Design for ‘announcements’	100
Table 6.7: Route Design for ‘attachments’	101
Table 6.8: Route Design for ‘settings’	101
Table 6.9: Route Design for ‘users’	101
Table 6.10: Route Design for ‘category’	102
Table 7.1: Unit Test Case – Test Register New Account	125
Table 7.2: Unit Test Case – Test Login Verification	126

Table 7.3: Unit Test Case – Test View and Search Announcement	128
Table 7.4: Unit Test Case – Test Create, Edit and Archive Announcement	130
Table 7.5: Unit Test Case – Test View and Search Item Found	132
Table 7.6: Unit Test Case – Create, Edit and Archive Item Found	134
Table 7.7: Unit Test Case – Test Claim Item	136
Table 7.8: Unit Test Case – Test Claim Item	137
Table 7.9: Unit Test Case – Test Archive Claim	141
Table 7.10: Unit Test Case – Test View and Search Lost Case	141
Table 7.11: Unit Test Case – Test Report Lost Case	144
Table 7.12: Unit Test Case – Test Archive Lost Case	145
Table 7.13: Unit Test Case – Test View and Search Item for Sale	146
Table 7.14: Unit Test Case – Test Bid Item for Sale	147
Table 7.15: Unit Test Case – Test Approve Item for Sale	148
Table 7.16: Unit Test Case – Test Update Profile	150
Table 7.17: Unit Test Case – Test Change Password	152
Table 7.18: Integration Test Case	155
Table 7.19: User Acceptance Test Result for Admins	162
Table 7.20: User Acceptance Test Result for Students	162
Table 8.1: System Limitations and Recommendations for Future Work	164

LIST OF FIGURES

Figure 1.1: Prototyping Methodology (Dennis, Wixom and Tegarden, 2005)	6
Figure 1.2: Overview of System Scope	7
Figure 1.3: Overview of Project Module	8
Figure 2.1: Waterfall Model (Dennis, Wixom and Tegarden, 2005)	12
Figure 2.2: Kanban Methodology	13
Figure 2.3: Scrum Events	14
Figure 2.4: Prototyping Model (Dennis, Wixom and Tegarden, 2005)	17
Figure 2.5: Interface of Crowdfind (Crowdfind, n.d.)	19
Figure 2.6: Interface of RepoApp (RepoApp, n.d.)	21
Figure 2.7: Interface of FidoFinder (FidoFinder, n.d.)	23
Figure 2.8: Auction Models	26
Figure 3.1: Prototyping Methodology	31
Figure 3.2: Work Breakdown Structure (WBS)	32
Figure 3.3: Gantt Chart	33
Figure 3.4: Way to find the lost and found information in UTAR	33
Figure 3.5: Problems encountered by students in accessing lost and found information	35
Figure 3.6: Comments on the lost and found information posted on Facebook	36
Figure 3.7: Confidence level on the deliverability of lost and found information on Facebook to students	37
Figure 3.8: The most important components in lost and found advertisements	38

Figure 3.9: Preferred platform to access UTAR lost and found information	38
Figure 3.10: Expected features in lost and found application	40
Figure 3.11: Confidence level on the positive impact of search functionality towards the deliverability of lost and found information	41
Figure 3.12: Development Tools	42
Figure 4.1: Use Case Diagram	52
Figure 5.1: System Architecture Design	72
Figure 5.2: Navigation Design for Web	73
Figure 5.3: Navigation Design for Mobile	73
Figure 5.4: Entity Relationship Diagram	74
Figure 5.5: Activity Diagram : Login	81
Figure 5.6: Activity Diagram : Register	82
Figure 5.7: Activity Diagram : View and Search Announcement	83
Figure 5.8: Activity Diagram : Manage Announcement	84
Figure 5.9: Activity Diagram : View and Search Found Item	85
Figure 5.10: Activity Diagram : Manage Item Found	86
Figure 5.11: Activity Diagram : Claim Item	87
Figure 5.12: Activity Diagram : Manage Claim	88
Figure 5.13: Activity Diagram : View Lost Case	89
Figure 5.14: Activity Diagram : Report Lost Item	90
Figure 5.15: Activity Diagram : View and Search Item for Sale	91
Figure 5.16: Activity Diagram : Bid Item for Sale	92
Figure 5.17: Activity Diagram : Manage Item for Sale	93
Figure 5.18: Activity Diagram : Update Profile	94
Figure 5.19: Activity Diagram : Change Password	95

Figure 6.1: Role-Based Access Control Diagram	103
Figure 6.2: Register page	104
Figure 6.3: Verification mail received after registration	104
Figure 6.4: Resend email form	104
Figure 6.5: Register page in mobile view	105
Figure 6.6: Login page	106
Figure 6.7: Home page from staff and student view	106
Figure 6.8: Home page from staff admin view	106
Figure 6.9: Login page from mobile view	107
Figure 6.10: Announcement Page from admin view	108
Figure 6.11: Announcement Details Page	108
Figure 6.12: Post new announcement page from admin view	109
Figure 6.13: Announcement page from mobile view	109
Figure 6.14: Item Found page from staff and student view	110
Figure 6.15: Item Details page from staff and student view	111
Figure 6.16: Item Found page from admin view	111
Figure 6.17: Item Found page from mobile view	112
Figure 6.18: Claim Item page from staff and student view	113
Figure 6.19: Claim Item page from staff and student view	113
Figure 6.20: Claim Record page from staff admin view	114
Figure 6.21: Claim Item page from mobile view	114
Figure 6.22: Lost Case page from staff and student view	115
Figure 6.23: Report Lost page from staff and student view	116
Figure 6.24: Lost Case page from admin view	116
Figure 6.25: Lost Case page from mobile view	117

Figure 6.26: Item for Sale page from staff and student view	118
Figure 6.27: Item Details page from staff and student view	118
Figure 6.28: Item for Sale page from staff admin view	119
Figure 6.29: Item for Sale page from mobile view	119
Figure 6.30: Profile page from staff and student view	120
Figure 6.31: Profile page from staff and student view	121
Figure 6.32: Profile page from staff admin view	121
Figure 6.33: Profile page from mobile view	122
Figure 6.34: Staff Admin Account page from system admin view	123
Figure 6.35: Create New Staff Admin account page from system admin view	123
Figure 6.36: Item Category page from system admin view	124
Figure 6.37: Add New Item Category page from system admin view	124

LIST OF SYMBOLS / ABBREVIATIONS

<i>UTAR</i>	Universiti Tunku Abdul Rahman
<i>DSS</i>	Department of Safety and Security
<i>CRUD</i>	Create, Retrieve, Update and Delete
<i>UI</i>	User Interface
<i>SDLC</i>	Software Development Life Cycle
<i>WIP</i>	Limiting Work in Progress
<i>NUS</i>	National University of Singapore
<i>WBS</i>	Work Breakdown Structure
<i>MVC</i>	Model-View-Controller
<i>IDE</i>	Integrated Development Environment

LIST OF APPENDICES

APPENDIX A: Questionnaire	167
APPENDIX B: Result of Questionnaire	171
APPENDIX C: Storyboard	177
APPENDIX D: User Acceptance Test Case for Admin	185
APPENDIX E: User Acceptance Test Case for Student	187

CHAPTER 1

INTRODUCTION

1.1 Introduction

According to James Gleik's study, people spend around 16 minutes each day to search for their lost items (Ahmad, et al., 2015). Furthermore, according to Tunajek (2009), the American Demographic Society states that Americans as a whole spend almost 9 million hours a day looking for lost items and it might be because of excessive clutter. The above research shows that people are extremely careless in handling personal items. Most of the time these lost items are around us but we are not able to find out on time.

People nowadays are too busy and it is common for them to lose items. Universiti Tunku Abdul Rahman (UTAR) students have a habit of losing or misplacing their personal items which might be valuable to them such as keys, student id cards and mobile phones. All UTAR students are allowed to report and hand over any lost items to the Department of Safety and Security (DSS). There are some Facebook groups such as "UTAR-Sg Long Campus" that allow students to post or check their lost and found items. If students found their items on the Facebook groups, they can contact the persons to claim back their lost items. However, the current way is not efficient to manage and deliver the latest lost and found information to relevant students so the rate of return items is low.

The main goal of the project is to design and implement an application to handle all these items and ensure that everything is tracked efficiently. It is a cross-platforms so users can access it through a web browser and mobile device. This will eventually reduce the time and efforts for handling lost and found information.

1.2 Problem Statement

These are the few problems listed in this project. These problems are identified from direct observation of the target users and survey conducted in UTAR. The problems are listed below:

i. Inconvenient lost and found procedures

All students desire to find their lost items through the easiest way as soon as possible. Based on Appendix B, 76.7% of respondents usually find the lost and found information at DSS if they lost an item. However, some respondents think that it is inconvenient and time-consuming to go DSS many times to check for the items until their lost items have been found.

We can see the above lost and found procedures are not efficient based on the students' perspective. Sometimes the lost items are very common such as keys or water bottles and it is hard to identify uniquely based on descriptions. The department staff cannot confirm the actual owner of the lost items unless they call students for verification. The case of misidentification by department staff can be very high if the number of lost and found items increases. For students, they need to come over the DSS several times to verify until their lost items have been found.

Furthermore, the department provides a limited time for students to report or claim back items. The working hours of the department staff are from 8:30 a.m. to 5:30 pm. It causes inconvenience if students want to report or claim back their lost items at night immediately.

ii. Lost and found information is scattered and unorganized

The lost and found information should be managed and well-organized for a better view. However, the different ways to handle the lost and found items by UTAR cause the lost and found information to be scattered and unorganized. Most of the students follow UTAR standard lost and found procedures to hand over the items to DSS. However, some of them prefer to keep things to themselves and post advertisements on social media such as Facebook, waiting for the owners to contact them and claim back the items. By doing so, all the lost and found information is not well-organized.

Based on Appendix B, 76.7% of respondents usually find the lost and found information in UTAR at DSS but only 16.7% of respondents find it in Facebook groups such as "UTAR-Sg Long Campus". It is because the information is unorganized and it reduces a student's willingness to search for it on Facebook. 46.7% of the respondents think that the current lost and found information on Facebook is hard to access as it is scattered and unorganized. Some of the

respondents also reveal that there is too much information on Facebook and they do not know where to get the actual information.

For students who have lost items, many actions should be taken to search for their items. For example, they should go to DSS to check for their items. In addition, students should check the Facebook posts as people might post lost and found advertisements anywhere. It is time-consuming for students to read through all the Facebook posts one-by-one to find their lost items. At this time, there is no specific platform that allows the staff to manage and organize all information at ease. It causes confusion and inconvenience as students require to access various sources to find all relevant information.

iii. Failure to deliver the latest lost and found information to students

The latest lost and found information is expected to reach target students to ensure a high rate of returned items. However, based on Appendix B, 73.3% of respondents think that students have half a chance or even less than it to see their lost items being advertised on Facebook. No respondent believes that students can see their lost items being advertised on Facebook. It shows that the confidence level of students at Facebook in delivering the latest lost and found information is quite low.

There are so many posts on Facebook per day as users are allowed to post anything on it. Most of the time the lost and found advertisements are mixed with other irrelevant posts and it is easy to skip over the posts. Once they skip over the posts, they might never see it again and it reduces the chances for the owners to claim back their items.

Furthermore, there is no restriction for the contents of Facebook posts so students can post the lost and found advertisements in any format. For example, some Facebook posts only attach with single items images without any further descriptions such as location and date found. It might cause people to be confused with just providing the images if the items are very common. Some people might use the search by keywords function on Facebook to find their lost items. However, it might be useless if students do not provide a detailed description for the items.

1.3 Project Objectives

1. To analyze the existing lost and found problems in UTAR and the features of similar systems.
2. To design an architecture for the lost and found management system.
3. To develop a cross-platforms lost and found management system which provides a standardized, centralized way to manage lost and found items in UTAR.
4. To improve the efficiency and effectiveness in managing and organizing the lost and found items in UTAR.

1.4 Proposed Solution

i. Able to use both web browser or mobile device to access information

Based on Appendix B, 53.5% of respondents prefer to use mobile applications and 46.7% of respondents prefer to use web applications to access all lost and found information in UTAR. Therefore, a cross-platform application was implemented so students can use both web browsers or mobile devices to access lost and found information anytime to increase efficiency.

The implementation of cross-platform applications can simplify the whole lost and found procedures. It allows students to use personal computers or mobile devices to search for their items. Furthermore, it allows students to post lost and found advertisements immediately on the application without going to the DSS. By doing so, students can find their lost items through the easiest way in a short time.

Students can report anytime by using their personal computers or mobile devices once they lost or found an item no matter where they are as the system is available 24/7. This increases their willingness of students to take the initiative to post the lost and found advertisements by just filling in the forms in the application. Once the report rate of the lost items increases, it means that owners have a high chance to find and claim back their items.

ii. Centralized information within an application

By implementing the lost and found management system, all information can store and maintain in a single database so it can be retrieved at the same time from the system. Any updates to records are immediately reflected to users.

Staff will update the items with detailed information in the system if they receive lost and found items from students. For students who prefer to keep things to themselves and post advertisements on Facebook, they are encouraged to report in the system to ensure all information is centralized within a single application. By doing so, students are not required to access multiple sources to get the lost and found information.

iii. Provide search and filter functions

Based on Appendix B, 93.3% of respondents believe that an accurate search functionality in an application can improve the deliverability of lost and found information to students. Thus, users are allowed to search and filter the lost and found items in this system. For example, if a student lost his phone, he can search the items by using the keyword of 'phone' in the specific column to filter out irrelevant items and just focus on what they want to find. In addition, users can search the items based on different categories such as clothing, mobile device or student card. By doing so, all relevant information can reach the target students effectively.

To aim for a better search and filter experience, it is important to ensure all records can be stored and well-organized in the database. Therefore, form validation was applied in the system to ensure the information provided by users is properly formatted in the database. The data will further be sent to the server for processing only if users provide all the required details.

1.5 Project Approach

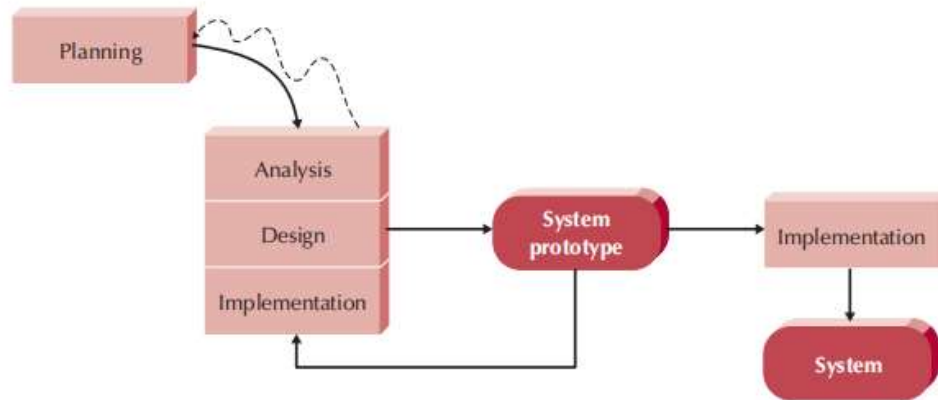


Figure 1.1: Prototyping Methodology (Dennis, Wixom and Tegarden, 2005)

As shown in the figure above, the proposed methodology is prototyping methodology. Prototyping methodology performs the analysis, design and implementation stage concurrently (Dennis, Wixom and Tegarden, 2005). These stages can be performed repeatedly until all the features in the system prototype is completed. Nacheva (2017) states that the prototyping methodology can provide a clear representation of the software requirements to users and facilitate the development process.

Prototyping methodology is suitable to be applied in this project because users are involved in the development stage. User interface (UI) is essential in the development of software applications. A well-designed interface provides a better user experience as well as improves the usability and accessibility of the system. Therefore, a software prototype with much user involvement is required before the actual implementation of the lost and found management system.

After the multiple times of evaluation from users to the system prototype, errors can be detected and refined earlier. It is because users can provide constructive feedback and comments on the initial system prototype immediately based on their needs. The prototyping methodology can improve the user acceptability of the final system as all necessary changes have been informed by the users in the early stage.

1.6 Scope

The section below explains the system scope and project modules.

1.6.1 System Scope

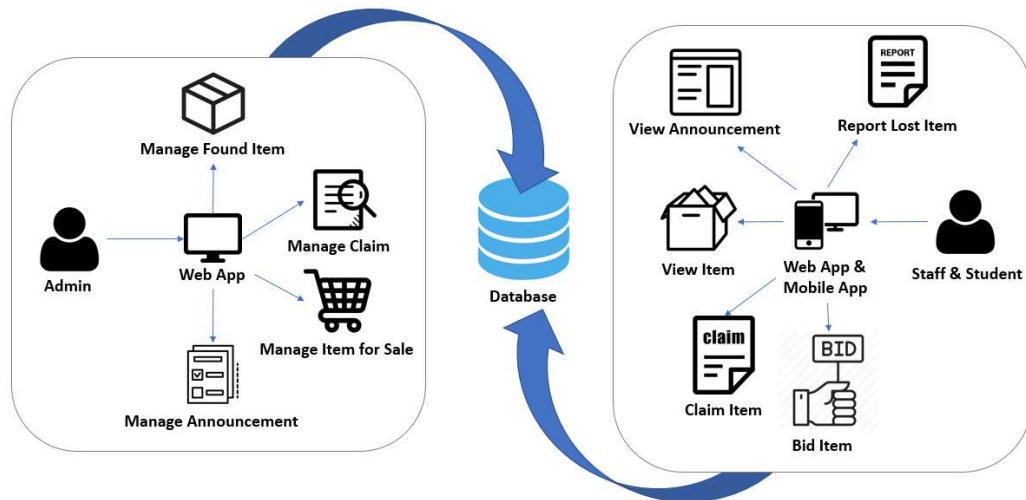


Figure 1.2: Overview of System Scope

This project is to implement a lost and found management system for UTAR staff and students which involves a few modules in this cross-platform application. The admins can only access through web browsers. However, for UTAR staff and students, they can access through web browsers and mobile applications.

All lost and found information will be displayed orderly with detailed descriptions. The system provides a search engine for staff and students to search and filter the items based on different criteria. If items matched the search criteria, the system will display that particular item as a search result, otherwise, it displays 'No record found'. Staff and students are allowed to report lost items by filling in the forms in the system. Form validation is applied in this system so staff and students are required to provide all necessary information in order to report the items successfully. If staff and students found their lost items in the system, they can submit the claim form before they claim back their items at the department. Furthermore, the staff and students can view all announcements posted by admins.

Admins can login into the system to manage all records in this system such as lost and found items records, claims records as well as announcements. All the found items will be kept for a certain duration. The default expired duration is 30 days.

However, the admin can set their own expired duration in the system. If there is no response from students within the expired duration, all unclaimed items will be opened for students to bid. Staff and students can enter the bid amount for the items. The bid amount should be higher than the current bid. The admins are allowed to determine the starting bid of these selling items.

1.6.2 Project Modules

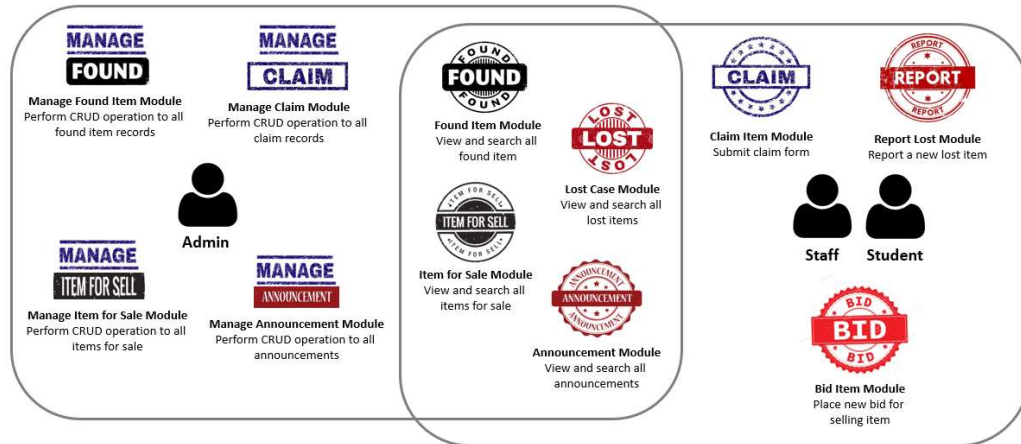


Figure 1.3: Overview of Project Module

i. Found Item Module

Staff and students can view all found items with detailed descriptions. They can use the search and filter functions to find specific items based on different criteria. They can click into the items to view more information.

ii. Lost Case Module

Staff and students can view all lost cases with detailed descriptions. They can use the search and filter functions to find specific items based on different criteria. They can click into the items to view more information.

iii. Item for Sale Module

This module shows the list of items for staff and students to place their bids. All the found items will be kept for a certain duration. If there is no response after the expired duration, all expired items will be opened for staff and students to bid.

- iv. **Announcement Module**
Staff and students can view all announcements posted by admins. They can use the search function to filter the announcements based on different criteria. They can click on the announcement subject to view the content.
- v. **Manage Found Item Module**
Admins are allowed to manage and perform create, retrieve, update and delete (CRUD) operations to all found item records in this module.
- vi. **Manage Claim Module**
This module shows the list of claim records submitted by students. Admins are allowed to manage and perform create, retrieve, update and delete (CRUD) operations to all claim records in this module.
- vii. **Manage Item for Sale Module**
Admins are allowed to approve the expired items for sale. They are required to determine the starting bid price and the bid end date of selling items. Admins are allowed to manage and perform create, retrieve, update and delete (CRUD) operations to all items for sale in this module.
- viii. **Manage Announcement Module**
Admins are allowed to manage and perform create, retrieve, update and delete (CRUD) operations to all announcements in this module. It is optional for admins to upload the attachments for the announcements.
- ix. **Claim Module**
If staff and students found their items from the listings, they can submit the claim form before they want to claim back their items. Claim form is to inform admin the personal information of item owners and their claim date.
- x. **Report Lost Module**
The staff and students can report their lost items by filling up the form with item descriptions in the system. They are required to provide all necessary

information in order to report their items successfully. All updated information will be stored in the database after they report a new item.

xi. Bid Item Module

The staff and students are allowed to enter a new bid amount for the selling items. The new bid amount must be higher than the current bid. Students with the highest bid can win the items after the bid end date.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, the comparison of software development methodology will be discussed. Besides that, similar existing lost and found systems are studied. The system features will be discussed and extracted out to include in this software project. Various auction models will also be compared and discussed in the following section.

2.2 Software Development Methodologies

Software development methodology is the process we use to develop a software application. Different methodologies have different implementations of the software development life cycle (SDLC). In this section, four development methodologies will be discussed, which are waterfall methodology, Kanban methodology, scrum methodology and prototyping methodology.

2.2.1 Waterfall Methodology

Waterfall methodology is a linear and sequential development model. It is a plan-driven methodology as it only focuses on plan implementation. In this sequentially structured approach, the project team will only proceed to the next development stage if the previous stage is completed (Yang, 2013). The key deliverables for each phase are very long. Normally, it requires the approval of the project manager to end the current phase before proceeding to the next step.

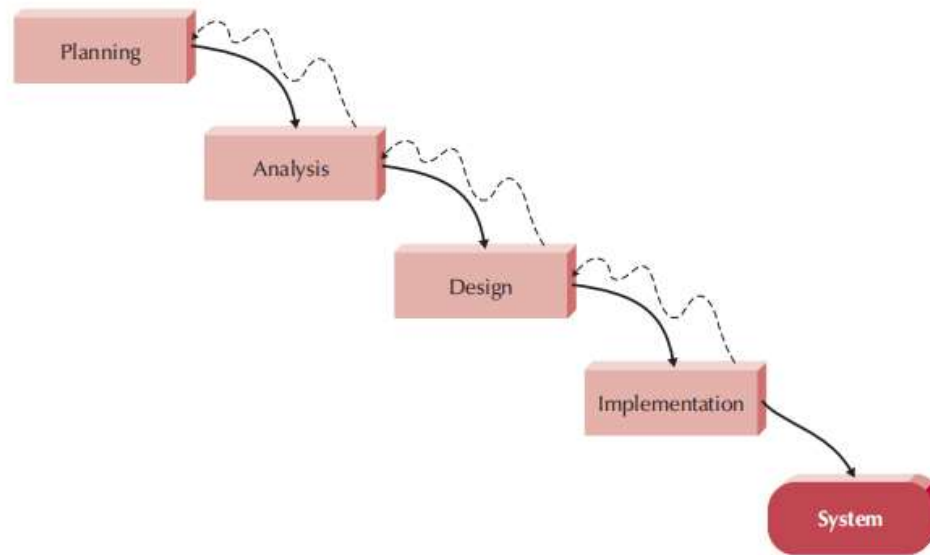


Figure 2.1: Waterfall Model (Dennis, Wixom and Tegarden, 2005)

- **High costs and efforts**

According to Petersen, Wohlin and Baca (2009), the waterfall model is connected to high costs and efforts. It is because waterfall requires a lot of documents approval, changes are expensive, iterations require much effort to rework and the problem only be identified in later phases. A survey was conducted by Petersen, Wohlin and Baca in 2009, the respondents stated that a lot of documentation needs to be prepared during the requirements phase, however, it is not used in later stages and sometimes it should be discarded and reworked.

- **Changes in requirement can be problematic**

According to Casteren (2017), the Waterfall model emphasizes on the software specification free, which means that any new requirements or features are not allowed to add in once finalized, agreed and approved by all stakeholders. It caused customers' sudden changes are not addressed, resulting in a low customer satisfaction product. Therefore, the waterfall model is more suitable to be used if the project requirements are well-defined and no possible changes are required.

2.2.2 Agile Methodology

Agile methodology was inspired by the Toyota Production System and it is widely implemented in software development projects around the world. According to Lei, et al. (2017), unlike traditional software development models, the attractive characteristics of agile methodology are short development cycle, high customer interaction and high adaptability to change.

The findings of 13th Annual State of Agile Survey conducted in 2018 by CollabNet VersionOne stated that 69% of respondents use agile to enhance the ability to manage changing priorities by adopting agile. 65% of respondents state that agile improves project visibility and 64% of respondents realize that agile increases the business-IT alignment. It shows that agile will be benefited in delivering a successful software project.

The popular frameworks used to implement agile methodology are Kanban and Scrum. In the following section, we will discuss the comparison between Kanban and Scrum.

2.2.2.1 Kanban Methodology

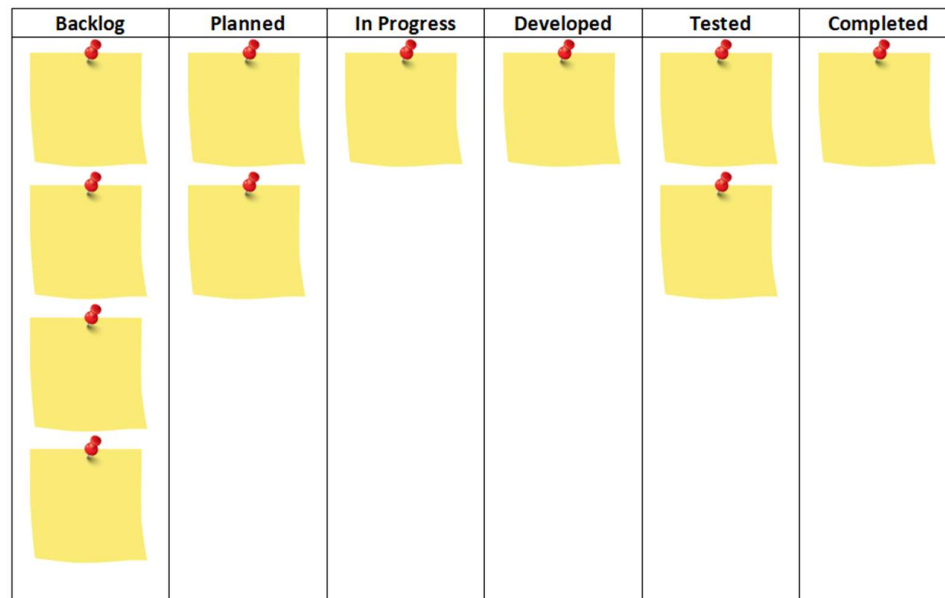


Figure 2.2: Kanban Methodology

- **High visibility**

Kanban card wall enables the project team to visualize the current progress of the project. The card wall states accurately what work should be done within a certain period. All required tasks are written onto colored sticky notes and added into the Kanban backlog. Once a task is completed in a specific step, it moves to the next step until it is fully completed. The tasks in the backlog should move through a number of steps until they are completed (Lei, et al., 2015).

- **Limiting Work in Process (WIP)**

Kanban limits the number of tasks in any step of the card wall. It can accept more tasks if a step has fewer tasks. However, if a step reaches a maximum number of tasks, it should only accept a new task if any tasks complete and move to the next step. A queue is used to allow for slack between steps and the tasks are assigned based on their priority. It means that we should put the most attention to the most important tasks to reduce any risk of task incompleteness.

2.2.2.2 Scrum Methodology

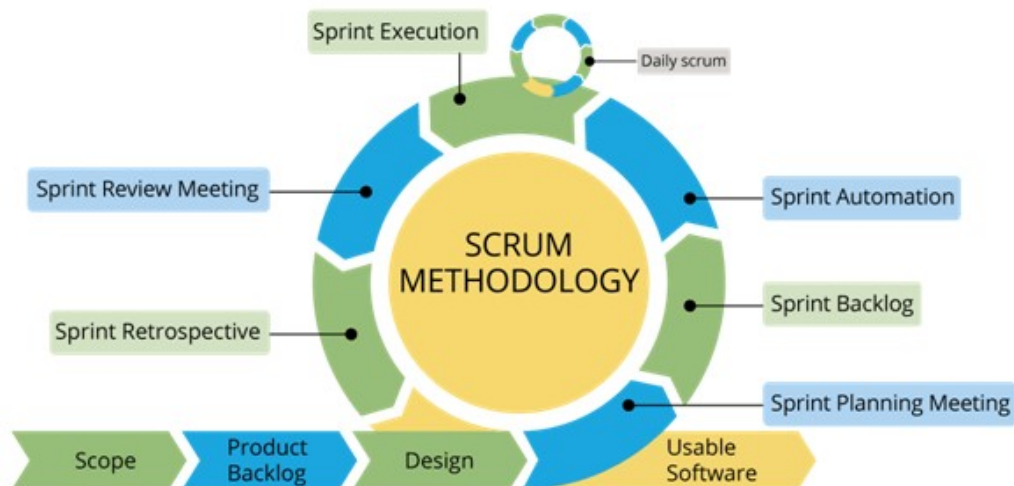


Figure 2.3: Scrum Events

The sprint is the core of the Scrum process. According to Lei, et al. (2015), each sprint can be considered as a sub-project with a plan of what should be built as well as how it should be built. Normally, the project teams require 30 days for a sprint. The development goals cannot be changed within the sprint cycle. However, the sprints can

be cancelled and project scope can be redefined if any changes occur to meet customers' requirements.

Scrum teams require a lot of meetings during the sprint cycle to ensure the product quality of each sprint. In the beginning, the project teams should conduct a sprint planning meeting to plan for the goals as well as the product's implementation process. Each member should have a common understanding of the project goals after the discussion. The duration of the sprint planning meeting is usually eight hours. In the sprint execution, there is a daily Scrum meeting for 15 minutes. Project team members should update their current progress and challenges faced each day. In addition, a sprint review meeting is conducted to discuss the contribution of each team member. It can also be a product demonstration so the project teams can identify the potential improvements for future sprint.

2.2.2.3 Comparison of Kanban and Scrum

According to Lei, et al. (2017), a survey was conducted to collect the responses from employees who use Kanban and Scrum in their software development projects. Among the total of 35 respondents, there are 60% (21 respondents) of the Scrum users and 40% (14 respondents) of Kanban users. The table below shows the average scores for each factor for both Kanban and Scrum:

Table 2.1: Average scores for each factor, for both Kanban and Scrum (Lei, et al., 2015)

Factor	Kanban	Scrum
Time schedule	4.05	3.67
Clear project scope	3.68	3.60
Budget handling	3.79	3.87
Risk control	3.93	3.83
Available resource	3.93	3.88
Quality of project	4.02	3.98

Kanban scored an average of 4.36 but Scrum only had an average score of 3.76 for the awareness of project status. It shows that Kanban users are more aware of the project status than Scrum users. Furthermore, in the time schedule factor, the result

states that Kanban scored 4.05 while Scrum only scored 3.67. It shows that Kanban users can deliver tasks on time according to the project schedule. In scope, budget, risk and resources factors, Kanban scored slightly better than Scrum as the difference of average scores between them is not more than 0.1. Both Kanban and Scrum can deliver successful software projects as they scored around 4.0 in the quality factor. The survey results show that Kanban is more efficient than Scrum in terms of schedule, scope, budget, risk, resources and quality factors. In addition, Kanban performs better than Scrum in awareness of project status.

2.2.3 Comparison of Waterfall and Agile

According to Poe and Seeman (2019), a case study was conducted to investigate the software code quality in Waterfall and Agile projects based on software development hours and software defects. Eight project teams participated in the case study. Three of the project teams were selected to use Waterfall whereas five of them used Agile. The table below shows the defect analysis for Waterfall and Agile projects:

Table 2.2: Defect Analysis for Waterfall and Agile Projects (Poe and Seeman, 2019)

Project Methodology	Waterfall	Agile
Total Combined Development Hours	3140	2076
Total Number of Production Defects	19	21
Total Number of Pre-Production Defects	43	13
Percentage of Production Defects to Development Hours	0.61%	1.01%
Percentage of Pre-Production Defects to Development Hours	1.37%	0.63%

The software development hours and software defects were recorded for all teams during the software development life cycle. Based on the result, the project teams required 3140 development hours to complete a Waterfall project, which is 1064 hours longer than the Agile project (2076 hours). The total number of pre-production defects in Waterfall project teams was much higher than Agile project teams, 43 to 13 respectively, with the percentage of pre-production defects to development hours, 1.37%

to 0.63%. Furthermore, the total number of production defects for Waterfall (19 defects) and Agile (21 defects) were almost the same.

However, when we factored in the software development hours for both methodologies, Waterfall only had 0.61% of production defects to development hours whereas Agile had 1.01%. It is because more defects were found during the pre-production stage and the Waterfall project team spent more time fixing it before it came to production. The result of case study reveals that Waterfall methodology can ensure a higher software quality code but it requires a longer software development time for testing.

2.2.4 Prototyping Methodology

The prototyping methodology performs analysis, design and implementation phases concurrently to deliver a system prototype for user review. This cycle can be repeated multiple times until it meets user satisfaction. According to Dennis, Wixom and Tegarden (2019), the first prototype is usually the first part of the system and it can be re-analyze, re-design and re-implement to add in a few more features in every cycle. If the system prototype has been reviewed and approved by users, the developer can start the actual implementation to develop the final system.

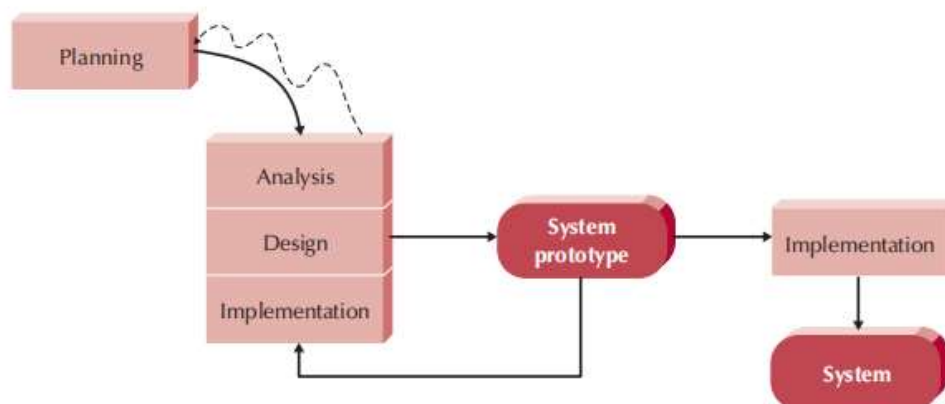


Figure 2.4: Prototyping Model (Dennis, Wixom and Tegarden, 2005)

- **Error can be detected earlier**

Prototyping methodology requires much user involvement in the development stage. Users can interact with the system prototype provided. At the same time, any immediate comments and feedback can be provided on time before it

comes to the actual implementation. Any misunderstandings or miscommunications between users and developers about the features of a system can be avoided. It helps to improve the quality of system specification provided by users and as the necessary changes have been informed in the early stage.

- **Excessive development time**

The prototyping methodology requires user feedback and recommendation on system prototype for improvements. The developers might spend too much time to deliver a complex prototype for user review. As the prototyping methodology allows users to request changes or enhancements, a lot of disagreements from users can cause an endless loop in re-analyzing, re-designing and re-implementing in order to provide a system prototype that achieves user satisfaction. In this situation, the project might run over time and budget.

2.2.5 Conclusion

Table 2.3: Comparison Matrix of Software Development Methodologies

Project Methodologies	Waterfall	Kanban	Scrum	Prototyping
with Unclear Project Scope	Poor	Good	Good	Excellent
with Short Time Schedule	Poor	Excellent	Excellent	Excellent
Schedule Visibility	Poor	Excellent	Good	Good
Flexibility	Poor	Excellent	Good	Excellent
Cost of change	High	Low	Low	Low

In conclusion, different software development methodologies have their own advantages and disadvantages. People should select the methodologies based on the situation as well as their needs and requirements. It is important to select a right methodology as it determines the success or failure of the software project.

Prototyping methodology will be chosen as the software development methodology in this project. This is because end users are allowed to be involved in

the development stage of the project. The feedback and comments of end-users are very important to a system prototype as any errors can be detected earlier.

Furthermore, the prototyping methodology has a better change control process. The changes or modifications can be flexible based on the users' feedback. It ensures that there are no out of scope or run-away-requirements at the end of the development stage. A more user-friendly system can be developed with the involvement of users by implementing the prototyping methodology.

2.3 Existing Lost and Found Systems

Four existing lost and found systems are studied in this section. The main features of these systems will be discussed and evaluated.

2.3.1 Crowdfind

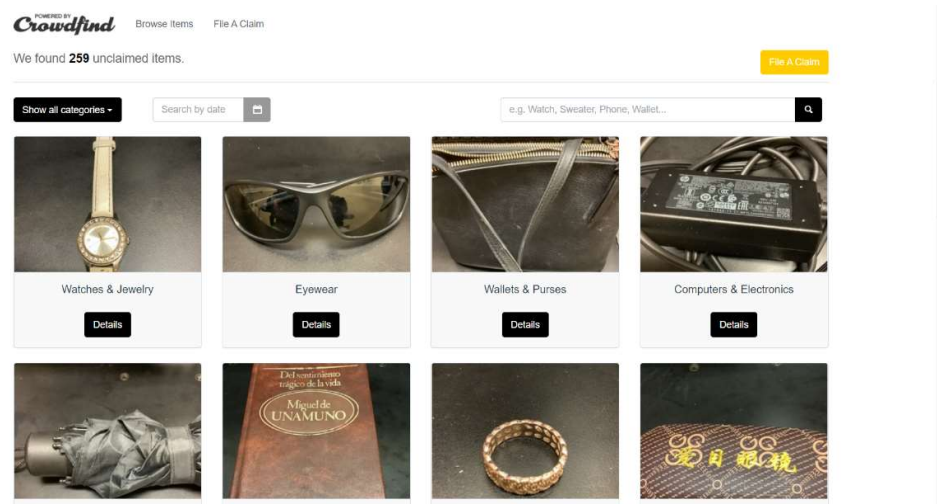


Figure 2.5: Interface of Crowdfind (Crowdfind, n.d.)

Main features of Crowdfind

- View lost and found information
Users can view all lost items in the homepage. Only item images and item categories are provided in the list. Users can search for a particular item by date or any keywords.
- Customized claim forms
The users are required to provide information in the claim forms based on the item category. They are encouraged to share any unique information for the

admin to verify their lost items. The more information provided, the higher the chance to match an item successfully.

- Chat function

The admins can directly communicate with customers in the system for further information or coordinate the pickup time and location.

- Automated reporting

The system can generate reports from the dashboard automatically. These reports can show the number of items is matched, the most common lost items and others.

- Email notification

The users will receive a confirmation email once a claim form is submitted. If they receive a message from the admin or their claim is accepted, they will receive an email notification from the system.

Evaluation on Crowdfind

Crowdfind is a lost and found system that was developed by a Chicago-based company. Crowdfind is an enterprise software and it is very popular to be used at universities in the United States such as University of Michigan, University of Iowa, Texas State University and more. Its image-based features and specialized dashboard provide companies with a better user experience

The best feature of Crowdfind is the customized claim forms. The system will generate customized questions that are set by admins for different items categories. For example, mobile phone owners should provide brand, model, color and passcode. The person who wants to claim back the identity card should provide the last 4 digits on the card as well as the date of birth. This item verification process is based on the detailed information provided by users on the claim form. Therefore, claims may be rejected by admins if accurate information is not provided. It helps to ensure that all the found items are returned to the actual owners. For those who plan to pretend to be someone else will fail to claim the items as they cannot provide sufficient information for that particular item.

Furthermore, another good feature is the email notification for claim forms. A confirmation email with relevant details will be sent to students' inbox after a claim form is submitted. It is possible that some students might forget the appointment they

have made before. With the existence of email notification, students can directly check and confirm their appointment in the email without logging into the system.

However, Crowdfind has a limitation as there is not much information provided in the lost and found list. The system only shows item images and item categories in the user view. It is still very difficult for the users to identify their items accurately although the images are provided as some of the items look similar. It causes many rejected claim cases as people need more unique information for verification.

In conclusion, unlike Crowdfind, the system should provide at least 3 types of lost and found information in the list. It is very helpful for students to identify their personal lost items clearly without much clicking. Furthermore, the email notification will also be implemented in the system.

2.3.2 RepoApp

The screenshot displays the RepoApp interface. At the top, there is a navigation bar with options like 'Items', 'Claims', 'Containers', and 'Bulk Release'. Below this is a search bar with a 'Keyword(s)' input field and a 'Q Search' button. An 'Advanced Search' section is expanded, showing various filters: 'Container' (TERMINAL A OFFICE BOX1), 'Found on or After' (01-23-2020), 'Status' (Released), 'Venue' (ACADEMIC BUILDING), 'Category' (-- Optional --), and 'Found on or Before' (01-28-2020). A 'Keyword' field contains 'Green SunGlasses'. Below the search form is a table of items with 15 entries. The table columns are: Item ID, Description, Expire After, Container, Venue, Category, Asset ID, Found Loc, Found Date, Storage Date, Status, Photo, Notes, and Created At.

Item ID	Description	Expire After	Container	Venue	Category	Asset ID	Found Loc	Found Date	Storage Date	Status	Photo	Notes	Created At
1709294	Green Sunglasses with gold frame	90	JUNE2 CONTAINER	ACADEMIC BUILDING	Personal - Wallet/Glasses/Keys			11-22-2019	11-22-2019	Available			11-22-2019
1704617	red wallet with keychain	90	JUNE2 CONTAINER	ACADEMIC BUILDING	Personal - Wallet/Glasses/Keys			11-12-2019	11-13-2019	Available			11-13-2019
1704289	Black iPad	90	JUNE2 CONTAINER	ACADEMIC BUILDING	Electronics - Cellphone/Camera/Tablet			11-11-2019	11-12-2019	Available			11-12-2019
1841422	Plantronics Headset black and white	90	JUNE CONTAINER	JOHN JAY BUILDING	Electronics - All Others			06-19-2019	06-22-2019	Available			06-24-2019

Figure 2.6: Interface of RepoApp (RepoApp, n.d.)

Main features of RepoApp

- View lost and found information

Users can view lost and found information with descriptions, expired date, location and date found, categories, status, updated date.

- Email notification

If the admins found a suspected owner, they can directly send emails through the system by just clicking on the email icon. The system can automatically fill

in the receiver, subject and body of the email. The admin can modify any information before sending it if they are not satisfied with the email contents generated. Furthermore, the email template can be customized anytime based on the requirements.

- Auto-match items

The users can search items with different criteria in the system. Based on the criteria provided, the system will try to find and match all the items. Any suspected items that match the criteria will show on the match list for users' verification.

- Release of unclaimed items

Admins are allowed to set the expired date for each item. After the items are updated, the system will count the number of days until it reaches the expired date. Any unclaimed items will be released from the lost and found information list.

Evaluation on RepoApp

RepoApp is a web-based lost and found software with a mobile-friendly design of user interface. It allows customers to integrate with the website so any operations can be done within their organization website. National University of Singapore (NUS) is now using RepoApp to manage lost and found items within the campus.

The best feature of RepoApp is the email notification to suspected owners. Normally, if the admins want to contact the suspected owners, they should login into their email account and write the email content before sending emails. It is a very time-consuming procedure. By implementing this email notification feature, admin can customize their own email template and the system can directly send emails based on the template provided. This feature reduces the employees' time spent working on unproductive tasks.

However, RepoApp does not provide item images in the lost and found information list. A picture is worth a thousand words as it can show the unique features of items more quickly and effectively than words. Users might find it very difficult to identify their lost items based on the descriptions provided.

In conclusion, the features of the search engine and email notification to inform suspected owners will be implemented in this system. It helps to reduce the issues of information overload as well as improve the deliverability of lost and found

information to students. The release of unclaimed items will also be implemented in the lost and found system. All the expired items will be opened for students to bid.

2.3.3 FidoFinder

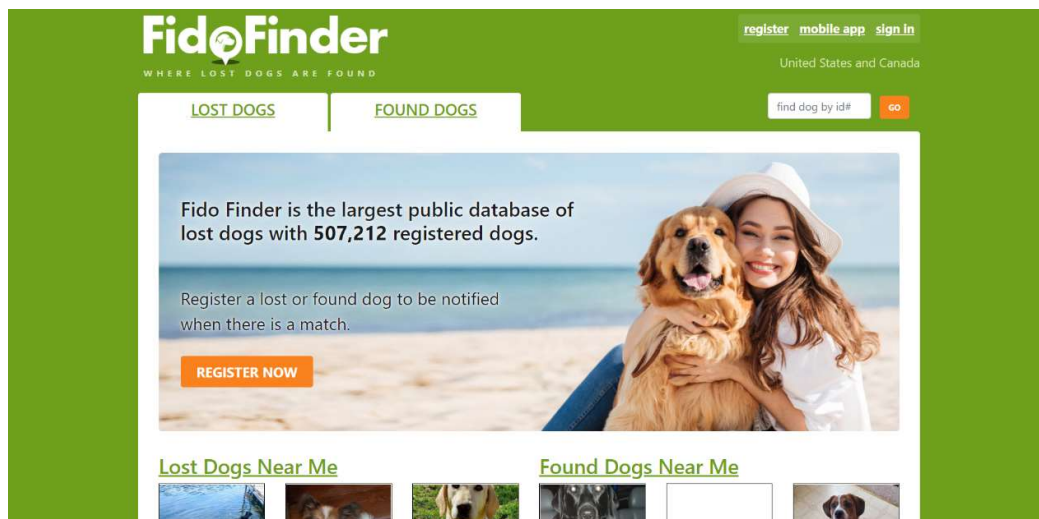


Figure 2.7: Interface of FidoFinder (FidoFinder, n.d.)

Main features of FidoFinder

- View lost and found information
Users can access all lost and found dogs with images. Only images will be shown on the listings. Users should click into the image to view more detailed information such as color, breed, gender and more. They can search the dog listings based on the characteristics as well as the postal code area.
- reCAPTCHA verification
Some users might provide their phone number for others to contact them immediately. There is a “View Phone Number” button that can reveal the phone number. Users should check the reCAPTCHA checkbox of “I’m not a robot” for verification before showing the phone number.
- Instant notification to mobile application
Users are encouraged to use mobile applications to receive instant notification. After installing the mobile application, they should login to their account and accept “Allow Notifications” when the application asks for permission.
- Pre-registration

Users can pre-register their dogs although the dogs are still safe. The system will update dogs in safe listings. Users can mark the status as “lost” if their dogs get lost. The person who found the dogs can change status to “presumably safe” and directly contact the owners of lost dogs.

Evaluation on FidoFinder

FidoFinder is a lost and found dog website that helps to connect the lost dog’s owners and finders. The best feature of FidoFinder is the pre-registration function. It allows people to register their dogs online before they get lost. Currently, FidoFinder already has 508,387 registered dogs. It becomes a large public database to store information about dogs. If people find a lost dog, they can search the registered dog listings based on the characteristics of the dog to get the owner’s information. It eases the whole lost and found process to be more efficient and effective.

However, the user interface (UI) design of FidoFinder looks messy. The lost and found dog listings are not shown in the home page. Users should enter the search criteria such as postcode, colour or dog breeds in order to get the information. It is not user-friendly as users are required to fill in the form before viewing the dog information and it reduces the willingness for people to use this website. Therefore, the system should directly show the lost and found dog listings in the first page of the website so all information can reach users at the earliest.

In conclusion, the issues of UI design in FidoFinder are studied and will be improved in this system. The lost and found information will be shown in the home page so users can view the item directly once they enter the web page. Furthermore, the search options are provided on the top of the listings so users can search the items anytime if it is needed.

2.3.4 Comparison of Crowdfind, RepoApp and FidoFinder

Table 2.4: Comparison Matrix of Crowdfind, RepoApp and FidoFinder

Existing System \ Features	Crowdfind	RepoApp	FidoFinder
View lost and found information	Yes	Yes	Yes
Show images	Yes	No	Yes
Search and filter function	Yes	Yes	No
Customize claim form	Yes	No	No
Chat function	Yes	No	No
Automated reporting	Yes	Yes	No
Email notification	Yes	Yes	No
Instant notification to mobile	No	No	Yes
Auto-match items	No	Yes	No
Release of unclaimed items	No	Yes	No
reCAPTCHA verification	No	No	Yes
Pre-registration	No	No	Yes

2.3.5 Conclusion

In conclusion, different lost and found systems have their own unique features that serve for different purposes. There are also some general features such as view lost and found information. Based on the evaluation of these lost and found systems, Crowdfind has the best features as compared to RepoApp and FidoFinder.

The overall interface design of Crowdfind is clean and neat which enables users to identify their items effectively. The features that are chosen to be implemented in this project are:

- i. View lost and found information in card format
- ii. Show item images
- iii. Search and filter function
- iv. Release of unclaimed items
- v. Email Registration

The above features can increase the willingness of students to report their lost items and actively view the information in the system. The search and filter function allow students to find the information they want rapidly. All the unclaimed items will be released and opened for students to bid after the expired date. If the students register a new account, they will receive a verification mail.

2.4 Auction Models

Auction is the event of a competitive sale where various potential buyers can place their bids for particular products or services. When the auction ends, the selected bidders should pay for the products or services based on the final bids they placed. According to Aldaej, et al. (2018), in recent years, the concept of auctions becomes increasingly common with online providers such as eBay. However, the benefits of auctions can be lost if they are not well-planned. It means that the architecture design of an auction is essential to deliver a best practice for the auction system.

There are 4 standard auction models to study in this section, which are English auction, Dutch auction, first-price sealed-bid auction as well as second-price sealed-bid auction. Different auction models have their own unique features that serve for different purposes. The main characteristics of these auction models will be discussed in the following section. The figure below illustrates the auction models.



Figure 2.8: Auction Models

2.4.1 Open-Bid Auction

Open-bid auction is the auction which is open and transparent for all participants. It consists English auction and Dutch auction. Both of them will be discussed in the following section.

2.4.2 English Auction

English auction, also called ascending-bid auction. According to Ilonka (2017), it is mostly used when it is difficult to determine the value of items or the seller is not aware of the valuation of the potential buyers. The process of English auction is carried out synchronously. All potential buyers can place their bids based on their acceptable prices which are higher than the current price. At the same time, the seller gradually raises the price of item until there is no more bid. The auction ends at a fixed time and the final bidder should pay his bid to get the item.

The main characteristics of English auction:

- **Easily observe the item value**

Unlike the sealed-bid auction, English auction is completely open and transparent. The participants are able to know the identity of others during the auction. Therefore, the participants can easily estimate the item valuation based on the observation towards each other. For the bidders who do not have much auction experience, they can observe other bidding behaviour as well as the highest bids at the past moments. All this information reveals the actual value of the items and current market demand.

- **Flexible bid jumping**

During the English auction, all participants can determine their own next bid amount. It encourages the participants to place the bids based on their ability. Flexible bid jumping actually increases their willingness to bid for the items as the bidders only require to bid a small amount with a slightly price increment. However, if all the participants have limited financial ability, the bid jumping can be very low, the seller cannot obtain the maximum possible price.

2.4.2.1 Dutch Auction

Dutch auction, also called descending-bid auction. According to Ilonka (2017), it is suitable when the auctions are required to sell out the items in a short time. Nicu, et al.

(2014) also stated that Dutch auction is useful if the seller wants to sell expensive items with high demand. The process of Dutch auction is also synchronous. Unlike English auction, the item of Dutch action starts at an extremely high price. If the potential buyers are willing to accept the price, they can submit the bid to get the item. The seller gradually lowers the price of the item until the item has been sold out.

The main characteristics of Dutch auction:

- **Work well when the bidding process is slow**

Unlike English auction, the participants can wait until the last possible moments to place their bid to prevent others to compete with them. It causes the whole bidding process to become slow as most participants are not willing to place bids at the beginning. According to Ilonka (2017), Dutch auction can solve this problem perfectly. In Dutch auction, the seller continuously lowers the price if there is no bidder. It reduces the waiting time as well as the high pressure causes participants tend to place the bids earlier to prevent others win the item. Therefore, the Dutch auction can be carried out faster than English auction.

- **Starting price is relatively close to market price**

In Dutch auction, the seller can set a starting price which is relatively close or even higher than the market price. The high pressure causes participants to bid sooner as the number of bids is limited. If the items are in high demand, the final price of the items should be very high. However, for the bidder without much experience, they might miscalculate or overbid the item. This situation is called the winner's curse.

2.4.3 Sealed-Bid Auction

Sealed-bid auction is a less transparent auction as compared to the open-bid auction. It consists of first-price sealed-bid auction and second-price sealed-bid auction.

According to Ilonka (2017), the first-price sealed-bid auction is equivalent to the English auction. It means that only the bidder with the highest bid can win the item. However, all participants can only place one bid before the end of the auction. The bid placed by each participant is not visible to others. After the bidding time, the seller starts to evaluate all the bids and select the highest bid to be the winner.

Second-price sealed-bid auction also called Vickrey auction. It is comparable to the first-price sealed-bid auction. The main difference is the winner determined by

the highest bid only has to pay the amount submitted by the second-highest bidder (Ilonka, 2017). Since all participants are not able to know the bid amounts submitted by others, the second-price sealed-bid auction can give them the confidence to bid the item with the best price without overpaying.

According to Hong, Wang and Paylou (2016), a study was conducted to investigate the effect of bid visibility on the auction performance by using the data from an online labor market. Based on the result, the sealed-bid auction (59.2%) can attract 18.4% more bids than open-bid auction (40.8%). However, the open-bid auction can offer a higher buyer surplus, which is \$10.87 higher than the sealed-bid auction. Based on customer feedback, the open-bid auction can also generate higher customer satisfaction than the sealed-bid auction. It shows that although the sealed-bid auction can attract more bids, the open-bid auction can have higher buyer surplus and customer satisfaction. Therefore, the sellers should determine the auction model based on their requirements and expected achievements of the auction.

2.4.4 Conclusion

Table 2.5: Comparison Matrix of Open-Bid Auction and Sealed-Bid Auction

	Open-Bid Auction		Sealed-Bid Auction	
	English Auction	Dutch Auction	First-Price Sealed-Bid Auction	Second-Price Sealed-Bid Auction
Suitable Situation	Sellers cannot determine the actual value of items	Sellers want to sell out items within a short time	Items have enough demand to attract bidders	Items have enough demand but still aim to attract more bidders to join
Advantages	Flexible bid jumping can attract more bids	Sellers can minimize the difference between the selling price	A low transparent bid can increase the potential for high return	Bidders gain the confidence to bid item

		and the actual price		
Disadvantages	Bid jumping can be very low	Stress bidding process causes miscalculation or overbid	Private bidding process causes low participation	Bidders can only place one bid and cannot adjust their bid after submitted

In conclusion, English auction will be chosen as the auction model in the system to sell the unclaimed items. It is because all items being sold are pre-owned items so it is difficult for the admin to determine the value of items. By implementing the English auction, the admin can set a minimum price for the items. Once the items are open for sale, all users are allowed to place any bids which are higher than the current price. The system will automatically raise the bids according to the bids submitted by users.

Furthermore, the auction in the system mainly aims to clear out all unclaimed items, instead of to earn higher profits. Therefore, English auction with flexible bid jumping actually encourages potential buyers to place their bids based on their ability without any financial pressure since the users in the system are mainly students. By doing so, the auction can have more participation from students.

CHAPTER 3

METHODOLOGY AND WORK PLAN

3.1 Introduction

The software development methodology used in this project is prototyping methodology. The figure below shows the model of prototyping methodology.

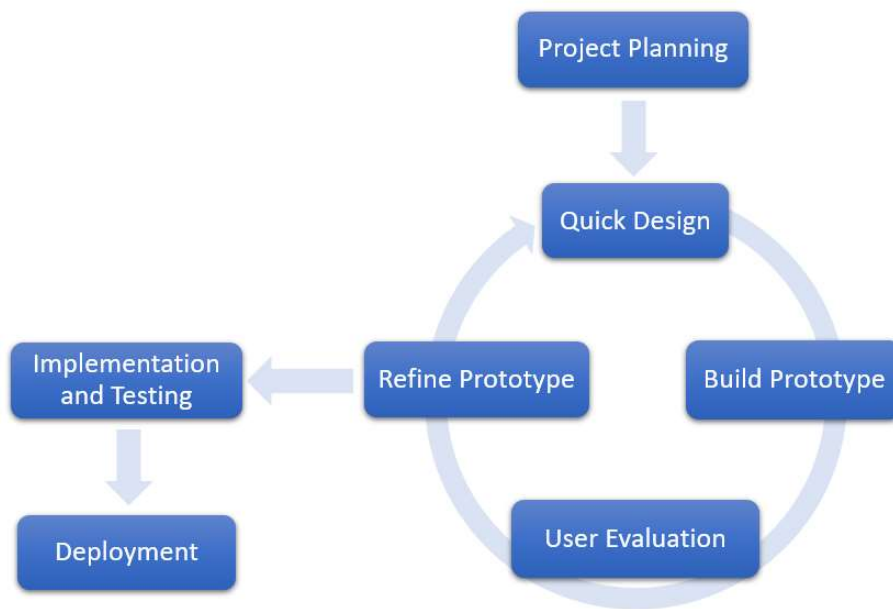


Figure 3.1: Prototyping Methodology

There are 4 phases in prototyping methodology, which are project planning, iteration process, implementation and testing and deployment. The detailed work of each phase will be discussed in the following section.

3.2 Project Planning

During the project planning, a set of plans were developed. All project tasks were planned and scheduled to ensure the project can be delivered within the time and scope. Work breakdown structure (WBS) and Gantt chart were developed to identify the project scope as well as illustrate the project schedule. Furthermore, a survey was conducted to collect the requirements Based on the analysis of the survey, the software

requirements and development tools can be determined. A quick design for system storyboard was also developed.

3.2.1 Work Breakdown Structure (WBS)

All tasks involved in this project are split into multiple sub-tasks and organized into the WBS. Each phase consists of specific tasks that should be completed before moving to the next phase. The figure below shows the WBS of this project.

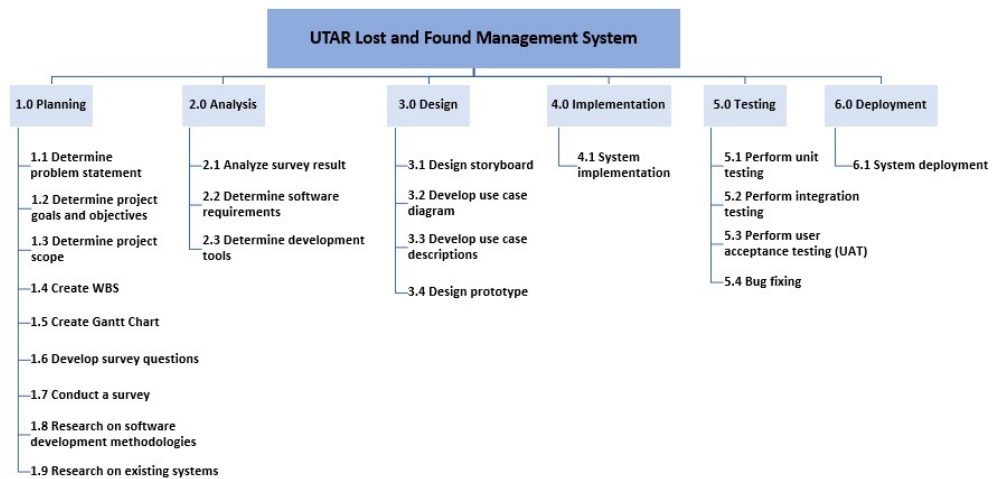


Figure 3.2: Work Breakdown Structure (WBS)

3.2.2 Gantt Chart

The purpose of Gantt Chart is to schedule all the project subtasks based on the given duration. By doing all, a clear and well-illustrated project schedule can be developed based on WBS. In this project, a Gantt chart was developed within the period of time between January and August. The figure below shows the Gantt chart in this project.

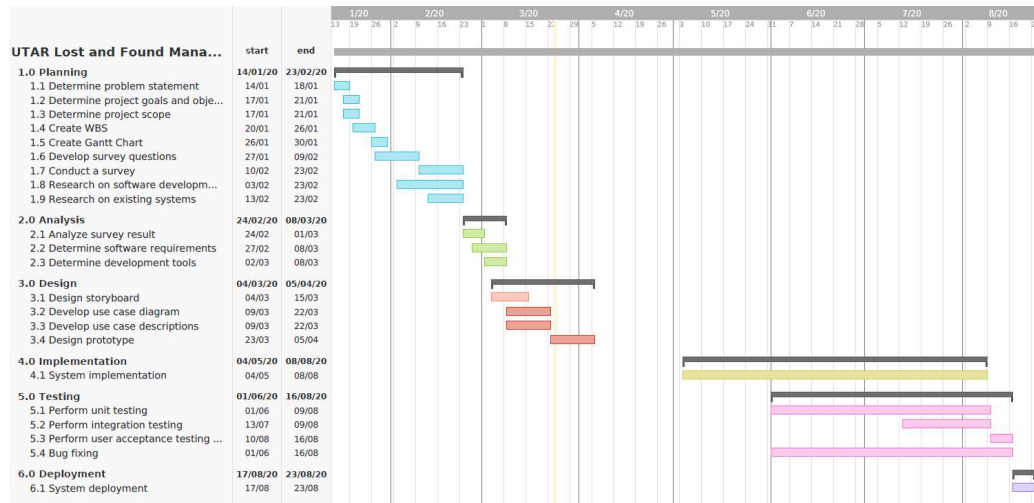


Figure 3.3: Gantt Chart

3.2.3 Survey Analysis

During the planning phase, a survey was conducted with 30 UTAR students. The objective of the survey is to collect the functional requirements from the target user as well as understand their needs and opinion towards the lost and found management system. The result of the questionnaires will be analysed and discussed in this section. The sample of questionnaires and its results are attached to Appendix A and Appendix B respectively.

How do you usually find the lost and found information in UTAR?
30 responses

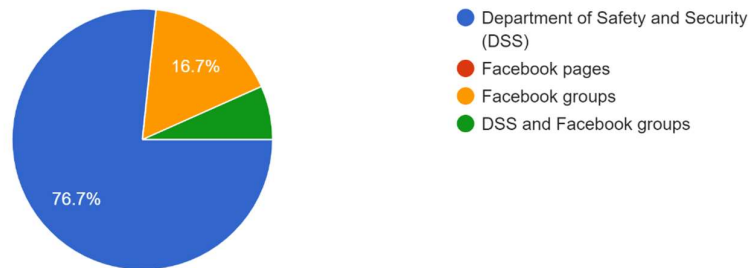


Figure 3.4: Way to find the lost and found information in UTAR

Based on Figure 3.3, most of the students (76.7%) access the lost and found information in UTAR through DSS. Some students (16.7%) access UTAR lost and

found information through Facebook groups such as 'UTAR-Sg Long Campus'. A Facebook page called 'UTAR SLC Lost & Found' occasionally updates lost and found information. However, no student finds the lost and found information through Facebook pages. In my opinion, it is because the update frequency of Facebook pages is very low. Currently, students still prefer to check the lost and found information through DSS as it is the most direct and fastest way.

What is the problem you encounter when you try to find the lost and found items in UTAR?

30 responses

No issue.

It is time-consuming because I should frequently go to department to find my items.

Hard to see my items on Facebook

Normally the item is hard to be found

Don't know where to collect the information

Sometimes Inconvenient to walk to DSS

Hard to search information.

Advertisements on Facebook are too messy

Cannot get all lost and found information in a platform

No image provided

Need to go DSS many times to check my items

Hard to find my items

Only can find lost item on DSS, but sometime I lazy go to DSS department

Can't find my items

Some people are lazy to hand over the items to relevant department

Too many information

Sometime lost item cannot be found at DSS

Hard to access. Don't know where to get the information.

Sometime hard to get information of the lost item.
 inconvenient to Department of Safety and Security
 Cannot get latest information from DSS
 Cannot check information immediately
 -
 When I lost something at school and I can't find it at the spot I left it.
 Hard to find
 No idea
 Can't find my items although I go DSS
 Not enough descriptions.
 Lost item may pick up by student and not passing to DSS
 Lazy to go DSS

Figure 3.5: Problems encountered by students in accessing lost and found information

Based on Figure 3.4, the main problems encountered by students are as listed below:

Table 3.1: Main problems encountered by students in accessing information

Problems Encountered	Number of Respondents
Hard to search and access the information.	15 (50.0%)
Inconvenient and time consuming for students to check information through DSS	8 (26.7%)
Cannot get the latest information immediately	2 (6.7%)
Item information is incomplete such as no image or not enough descriptions	2 (6.7)
No issue	3 (10.0%)

Based on Table 3.1, 15 respondents (50%) think that it is hard to search and access the lost and found information in UTAR. For the student who usually checks

lost and found information through DSS, 8 respondents (26.67%) think that it is inconvenient and time-consuming to check information through DSS. It is because some students might need to go DSS multiple times to check for their lost items until the item is found. 2 respondents (6.67%) state that they cannot get the latest information immediately and the other 2 respondents (6.67%) think that the item information on Facebook is incomplete. Some of the students do not provide the item images or the item descriptions are not unique enough for owners to identify their lost items.

How do you comment the lost and found information posted on Facebook?

30 responses

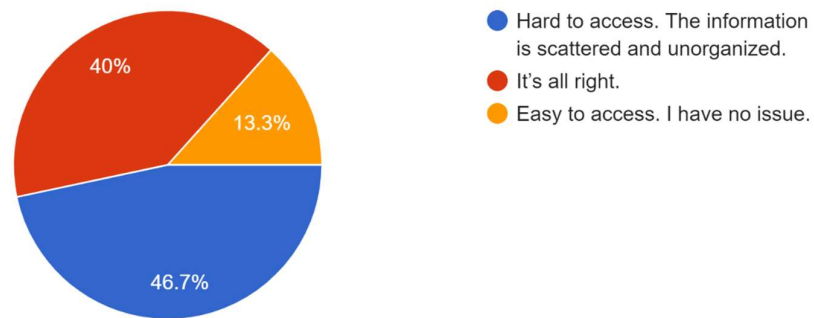


Figure 3.6: Comments on the lost and found information posted on Facebook

Based on Figure 3.5, most of the respondents (46.7%) think that it is hard to access the lost and found information on Facebook as it is scattered and unorganized. They are different types of sources for students to post lost and found advertisements on Facebook. It causes confusion as students cannot identify which are the most reliable and trustable sources. Furthermore, 40% of respondents state that it is still acceptable for the lost and found information posted on Facebook. Only 13.3% of respondents have no issue with it.

Do you think that students can see their lost items advertised on Facebook?

30 responses

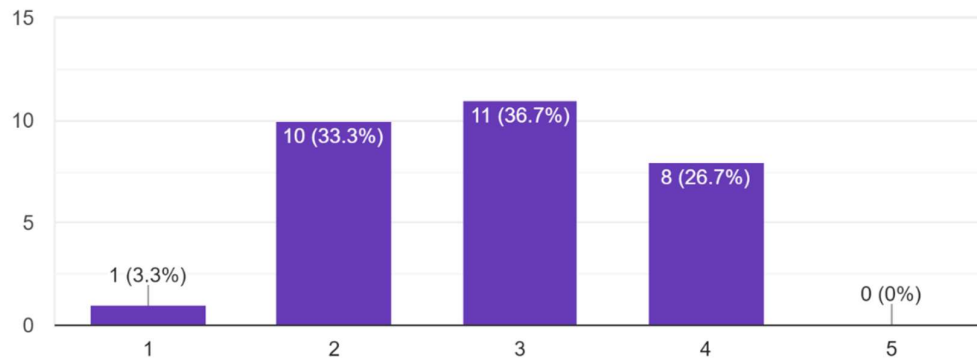


Figure 3.7: Confidence level on the deliverability of lost and found information on Facebook to students

In this question, the respondents are required to rate the deliverability of lost and found information on Facebook to students based on their opinions. Based on Figure 3.6, most of the respondents (36.7%) rate 3 for the deliverability of lost and found information on Facebook to students. It is because the deliverability of Facebook posts is very random so people cannot predict who will receive the information. No respondent believes that students definitely can receive the lost items posts advertised on Facebook. Furthermore, only 1 respondent thinks that the student definitely cannot receive the lost and found information on Facebook. Based on the result in this question, we conclude that most of the respondents have a moderate confidence level on the deliverability of lost and found information on Facebook to students.

Select the three most important components that should be included in lost and found advertisement.

30 responses

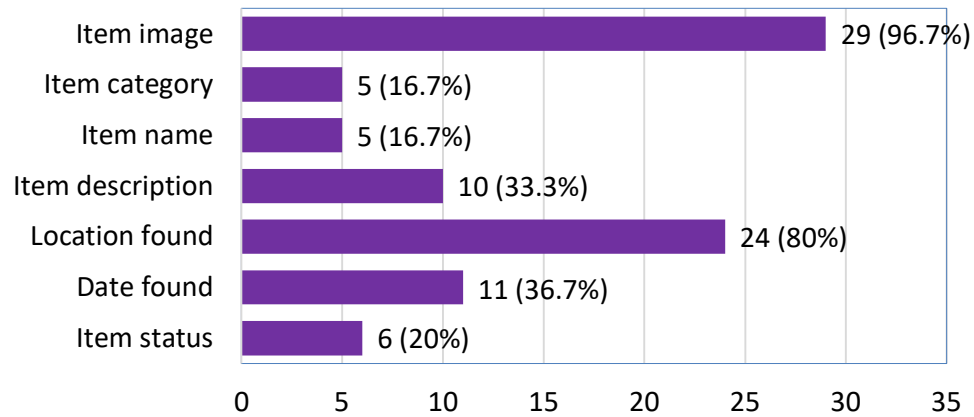


Figure 3.8: The most important components in lost and found advertisements

In this question, all respondents are allowed to select the three most important components. Based on Figure 3.7, item image (29 respondents) are the most important component in a lost and found advertisement, followed by location found (24 respondents) and date found (11 respondents). It is because the image can directly show the unique features of the item, together with the location found and date found, the owner can almost identify their lost item. Furthermore, 10 respondents think that the additional descriptions for the item are also important. The least important components are the item category (5 respondents) and the item name (5 respondents).

If you were to choose a platform to access all lost and found information in UTAR, which one do you prefer the most?

30 responses

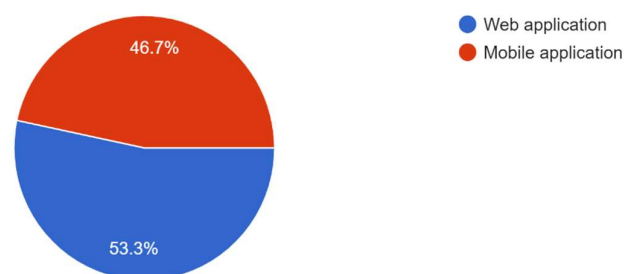


Figure 3.9: Preferred platform to access UTAR lost and found information

Based on Figure 3.8, 53.3% of respondents prefer to use web applications to access lost and found information whereas 46.7% of respondents prefer to use mobile applications. We can see that the percentage of web application and mobile application are almost the same. Some respondents prefer to use web applications as they do not require to install another application on mobile. However, some respondents prefer mobile applications as they can access the lost and found information anytime no matter where they are. Therefore, a cross-platform application can be developed to fulfill the needs of all respondents.

What are the features you expect in a lost and found application?

30 responses

Receive notification if items found

Well-organized items. Able to filter items.

Check who has claimed the item

Able to filter the lost items

User can see the return info of lost item.

Directly show the item images.

Search feature.

Search, filter and sort items

Search by keywords

Can access information anytime

Check items current status

Can tag other user.

Show lost and found items photos

Students can directly post advertisements in app. No need to hand over to department as some students are very lazy.

Register by student id

User who lost their item can also post picture to find back their lost item.

Can search based on keywords

Can get the contact of finder of lost item.

User friendly interface.

Can stated which item is already found

Allow students to post lost and found items

Can view & update lost and found items immediately.

Easy and convenient to use

Item filter

Can match the lost item image

Location of my item

Make appointment if I want to get back my items at DSS

Able to organize all items in an application

rules for disposal if no one claims a found item.

Can filter items for better search

Figure 3.10: Expected features in lost and found application

Based on Figure 3.9, the main expected features can be concluded as listed below:

Table 3.2: Main Expected Features in Lost and Found Application

Expected Features	Number of Respondents
Clear and well-organized lost and found information	13 (43.3%)
Search and filter items	8 (26.7%)
Allow student to report lost and found items	3 (10.0%)
User-friendly interface	2 (6.7%)
High accessibility	2 (6.7%)
Make appointment before claim back items	1 (3.3%)
Notification	1 (3.3%)

Based on Table 3.2, 13 respondents (43.3%) expect to have a clear and well-organized lost and found information in the application so they can have a better view on all items. 8 respondents think that search and filter functions are important in a lost and found application. Furthermore, 3 respondents also suggest to allow students to report their lost and found items on the application. It is because some of the students are too lazy to hand over the items to DSS. By doing so, it increases the willingness of students to report anything they found around UTAR. Few respondents also suggest to have a user-friendly interface (2 respondents), a high accessibility system (2 respondents), make an appointment before claim back items (1 respondent) as well as the notification function (1 respondent).

Do you think an accurate search functionality in application can improve the deliverability of lost and found information to students?

30 responses

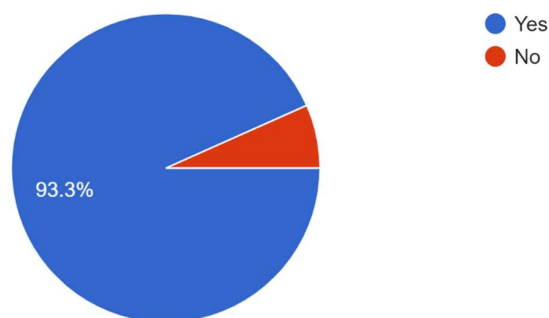


Figure 3.11: Confidence level on the positive impact of search functionality towards the deliverability of lost and found information

Based on Figure 3.10, most of the respondents (93.3%) believe that an accurate search functionality in application can improve the deliverability of lost and found information to students. Only 6.7% of respondents hold the opposite views. An accurate search functionality means that students can retrieve the lost and found items accurately based on the selected search criteria such as keywords, item categories or date range. The result shows that the respondents have a high confidence level on the positive impact of search functionality towards the deliverability of lost and found information to students.

3.2.4 Development Tools

In this project, various tools were used to implement the system for both web application and mobile application. All development tools will be discussed in this section.

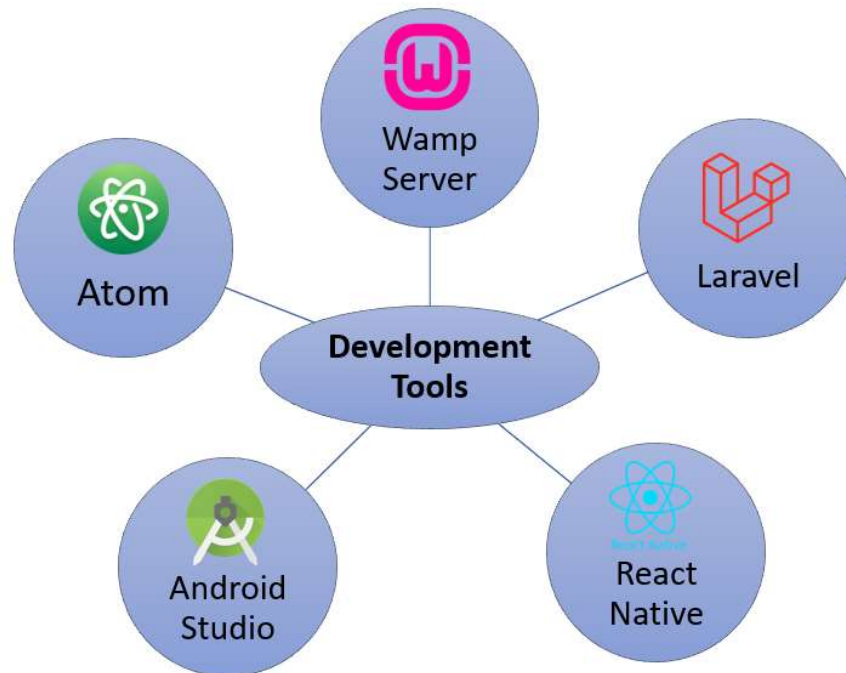


Figure 3.12: Development Tools

i. Wamp Server

Wamp Server is a web development platform that allows us to create a dynamic web application with Apache, PHP and MySQL (WampServer, n.d.). The features of Apache, PHP and MySQL are explained below.

- Apache: Apache is a HTTP web server
- PHP: PHP is a scripting language that is used for web development.
- MySQL: MySQL is a database management system that is used to store all data

ii. Laravel

Laravel is a free, open-source PHP framework intended for web application development by adopting the model-view-controller (MVC) architectural

pattern (Laravel, n.d.). A consistent API and predictable structures are provided by Laravel framework (Stauffer, 2019). According to Kaluža, Kalanj and Vukelić (2019), Laravel has large communities that can respond to the issues quickly. Therefore, developers can learn faster as there are more sufficient documentation and guidelines provided in Laravel communities.

iii. React Native

React native is an open-source framework for mobile application development. The developer can create a native mobile application for Android and IOS using React Native (React Native, n.d.). Furthermore, React Native enables the developer to build the application faster as they can reload the application instantly, instead of recompiling it.

iv. Android Studio

Android Studio is an integrated development system (IDE) for Android operating systems. It includes the emulators for different types of Android devices such as Android smartphones or Android Tablets for developers to test on their application (React Native, n.d.).

v. Atom

Atom is a text and source code editor. The most attractive feature of Atom is the GitHub package is bundled with Atom so developers can directly create new branches, push and pull as well as solve the merge conflicts in Atom (Atom, n.d.).

3.2.5 Quick Design

A storyboard was developed to show the system flow. The storyboard describes the user interactions with the system as well as enables developers to have a better understanding of system flow. The storyboard is attached to Appendix C.

3.3 Iteration Process

The iteration process is feature-driven. New features will be added for each iteration process. There are 4 main phases for each iteration, which are design, prototyping, evaluation and refining.

3.3.1 First Iteration

For the first iteration, the main features such as view and search lost and found information, claim lost and found items, report lost and found items as well as book unclaimed items was developed for web application. The iteration can be separated into 4 main phases:

i. Design phase

A storyboard was developed to have a better view on user interactions with the system. The interfaces of web application were developed in this phase.

ii. Prototyping phase

A prototype for web application was developed based on the storyboard in the design phase. The prototype should consist of the system flow from one screen to another screen.

iii. Evaluation phase

5 users were invited to evaluate the prototype developed in the previous phase. The feedback from users was collected and analysed for better improvements.

iv. Refining phase

The feedback analysis was summarised to determine the section to be refined. Then, the prototype was refined.

3.3.2 Second Iteration

For the second iteration, new features such as login, manage found item, manage unclaimed item as well as manage claim were added. The iteration can be separated into 4 main phases.

i. Design phase

After the previous prototype is refined, new features were added into this phase. A storyboard is developed and the interfaces of web application were developed based on the added features in this phase.

ii. Prototyping phase

Additional features were added into the prototype for web application.

iii. Evaluation phase

5 users were invited to evaluate the prototype with added features. Another feedback from users was collected and analysed for better improvements.

v. Refining phase

The feedback analysis was summarised to determine the section to be refined. Then, the prototype was refined.

3.3.3 Third Iteration

For the third iteration, the main features in the first iteration were developed for the mobile application. The iteration can be separated into 4 main phases:

i. Design phase

The interfaces for mobile application were developed in this phase based on the storyboard in the first iteration.

ii. Prototyping phase

A prototype for mobile application was developed based on the storyboard in the design phase. The prototype should consist of the system flow from one screen to another screen.

iii. Evaluation phase

5 users were invited to evaluate the prototype developed in the previous phase. The feedback from users was collected and analysed for better improvements.

iv. Refining phase

The feedback analysis was summarised to determine the section to be refined. Then, the prototype was refined.

3.4 Development and Testing

During the development phase, the web application will be implemented first as it is the main platform for both staff and students to perform CRUD operation. After the features of the web application was completed, the features of mobile application will be implemented subsequently.

During the testing phase, various testing was conducted to ensure the quality of the system such as unit testing, integration testing and user acceptance testing. All types of testing will be discussed in the following section.

3.4.1 Unit Testing

Unit testing was performed to test on a single piece of functionality. All components in the system were tested one by one. Test cases were developed not only to prove that the successful build of each component, but also reveal the system bug so the potential bug can be fixed immediately.

3.4.2 Integration Testing

Integration testing was performed to test the combination of two or more components in the system to ensure the system flow is working correctly. Test cases for integration testing were also developed.

3.4.3 User Acceptance Testing

For user acceptance testing, 15 users were selected to test on the web application as well as mobile application. A short survey was conducted to collect feedback from users. The result of the survey was analysed.

3.5 Deployment

During the deployment phase, the system for both web application and mobile application was fully completed. All features in the system were tested with no error and necessary bug fixing was done. The system is ready to be available for use.

CHAPTER 4

PROJECT SPECIFICATION

4.1 Introduction

In this chapter, functional requirements were determined based on the result of the survey conducted. The use case diagram and use case descriptions will also be shown and described in the following section.

4.2 Functional Requirement

Register

1. The system shall require users to enter name, email, contact number, password and confirm password to register an account.
2. The system shall send a verification mail to users to activate user accounts.
3. The system shall allow users to request for a resend email if the users have not received a verification email.

Login

1. The system shall require users to enter email and password to login into the system.

View and Manage Announcement

1. The system shall display all announcements in table format.
2. The system shall allow users to search announcements based on different attributes such as posted date, subject or department.
3. The system shall display “No Record Found” if no announcement matches the search criteria.
4. The system shall allow admins to post a new announcement.
5. The system shall require admins to enter announcement information such as subject and content.
6. The system shall allow admins to attach at most 5 attachments in the announcements.

7. The system shall display an error message if users do not provide all information required.
8. The system shall allow admins to modify the announcements.
9. The system shall allow to archive the announcements.
10. The system shall display a confirmation dialog box if the admins clicks on the archive button.

View Found Item

1. The system shall display item image, date found and location found in multirow card format.
2. The system shall allow users to filter items by item category.
3. The system shall allow users to filter items by selected date range.
4. The system shall allow users to search items by keyword.
5. The system shall display “No Record Found” if no item matches the search criteria.
6. The system shall allow users to click on the item card to navigate to the detailed page.
7. In the detailed page, the system shall display item image, item name, item category, description, date found, location found and current status.

Claim Item

1. The system shall display item information and user’s personal information.
2. The system shall require users to enter the claim date.
3. The system shall allow users to submit the claim form after the claim date is selected.
4. The system shall change the item status from “Available” to “Pending” if the claim form is submitted.
5. The system shall display an error message if users do not select the claim date.

View Lost Case

1. The system shall display item image, date lost and possible location in multirow card format.
2. The system shall allow users to filter items by item category.
3. The system shall allow users to filter items by selected date range.
4. The system shall allow users to search items by keyword.
5. The system shall display “No Record Found” if no item matches the search criteria.
6. The system shall allow users to click on the item card to navigate to the detailed page.
7. In the detailed page, the system shall display item image, item name, item category, description, possible location, date lost and owner information.

Report Lost Item

1. The system shall require users to enter item name, item category, description, possible location and date lost for lost item.
2. The system shall require users to upload the image of the lost item.
3. The system shall allow users to submit the report form after all information are provided.
4. The system shall display an error message if users do not provide all required information.

View Item for Sale

1. The system shall display the selling item image and current price in multirow card format.
2. The system shall allow users to filter items by item category.
3. The system shall allow users to search items by keyword.
4. The system shall allow users to click on the item card to navigate to the detailed page.

5. In the detailed page, the system shall display all information of the item such as item image, item name, item category, description, starting price, current price and bid end date.
6. The system shall allow users to view all bids for the selling items.
7. The system shall allow users to enter the bid amount for the selling items.
8. The system shall display an error message if the bid amount entered by users is lower than or equal to the current price.
9. The system shall change the value of the current bid after users place a new bid amount.

Manage Found Item

1. The system shall display item id, item name, item image, item category, description, location found, date found, person to claim item, location to claim the item and current status in table format.
2. The system shall allow admins to search the item based on different attributes.
3. The system shall display “No Record Found” if no item matches the search criteria.
4. The system shall allow admins to add a new found item.
5. The system shall require admins to enter item information such as item name, item category, description, location found, date found, person to claim item and the location to claim item.
6. The system shall require the admins to upload the item image.
7. The system shall allow admins to update a new found item after all information are provided.
8. The system shall display an error message if admins do not provide all required information.
9. The system shall set the item status as “Available” as default once a new item is added.
10. The system shall allow admins to modify the item information.

11. The system shall allow admins to archive the item.
12. The system shall display a confirmation dialog box if the admins clicks on the archive button.
13. The system shall set the item status as “Expired” if the item is expired.

Manage Claim

1. The system shall display the claim records such as claim id, item id, item name, item image, item category, claim date, owner name, email, contact number and current status in table format.
2. The system shall allow admins to search the claim records based on different attributes.
3. The system shall display “No Record Found” if no claim record matches the search criteria.
4. The system shall allow admins to change the claim status from “Pending” to “Claimed” or “No show”.

Manage Item for Sale

1. The system shall display a list of expired items which are not being approved to sell yet.
2. The system shall allow admins to determine the starting bid and bid end date to approve the item for sale.
3. The system shall set the item status as “Selling” as default once a new item is approved for sale.
4. The system shall allow admins to view all bids of the selling item.
5. The system shall set the selling item status as “Closed” after the bid end date.
6. The system shall allow admins to determine the final winner of auction after the bid end date.
7. The system shall allow admins to modify the selling item information.
8. The system shall allow admins to archive the selling item.

9. The system shall display a confirmation dialog box if the admins clicks on the archive button.

4.3 Use Case Diagram

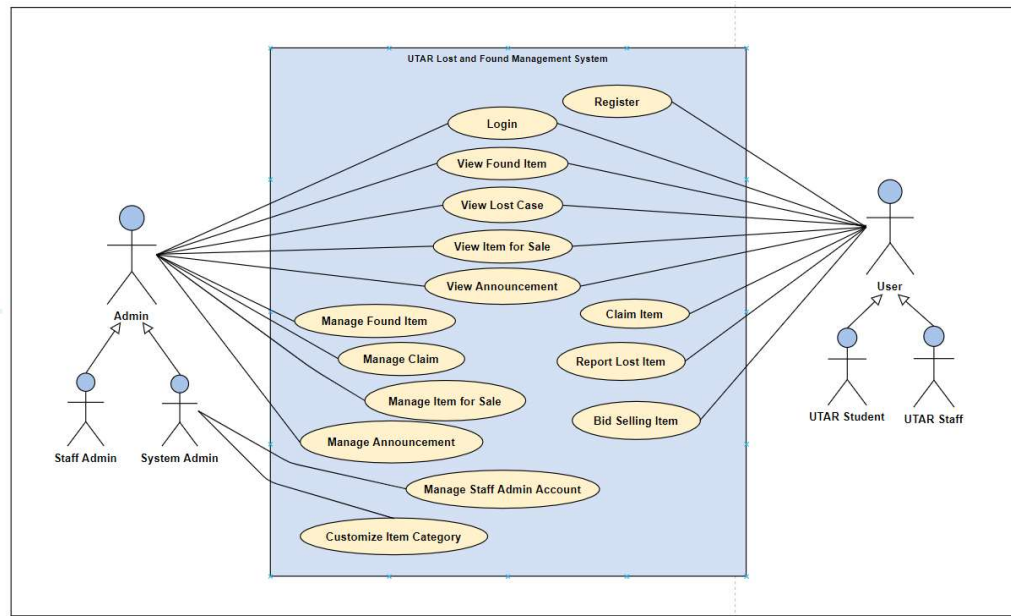


Figure 4.1: Use Case Diagram

4.4 Use Case Description

Table 4.1: Register Use Case

Use Case Name: Register	ID: 1	Importance Level: High
Primary Actor: Staff, Student	Use Case Type: Detail, essential	
<p>Stakeholders and Interests:</p> <p>Staff – wants to register a new account</p> <p>Student – wants to register a new account</p>		
<p>Brief Description: This use case describes how staff or student registers a new account</p>		
<p>Trigger: Staff or student enters the system.</p> <p>Type: External</p>		
<p>Relationships:</p> <p>Association: Staff, Student</p> <p>Include: -</p> <p>Extend: -</p> <p>Generalization: -</p>		
<p>Normal Flow of Events:</p> <ol style="list-style-type: none"> 1. The staff or student enters the system. 2. The staff or student enters the name, email, contact number, password and confirm password. 3. The staff or student clicks the ‘Register’ button. 4. The system sends a verification mail to staff or student. <ol style="list-style-type: none"> 4.1 If the staff or student clicks the link provided in verification mail, the account is verified. 4.2 If the staff or student does not click the link provided in verification mail, the account is not verified. 		
<p>Subflows:</p>		
<p>Alternate / Exceptional Flows:</p> <p>2a: If the name, email, contact number, password and confirm password are invalid, an error message will be shown.</p>		

Table 4.2: Login Use Case

Use Case Name: Login	ID: 2	Importance Level: High
Primary Actor: Admin, Staff, Student	Use Case Type: Detail, essential	
<p>Stakeholders and Interests:</p> <p>Admin – wants to login into the system as admin.</p> <p>Staff – wants to login into the system.</p> <p>Student – wants to login into the system.</p>		
<p>Brief Description: This use case describes how admin, staff or student logs into the system.</p>		
<p>Trigger: Admin, staff or student enters the system.</p> <p>Type: External</p>		
<p>Relationships:</p> <p>Association: Admin, Staff, Student</p> <p>Include: -</p> <p>Extend: -</p> <p>Generalization: -</p>		
<p>Normal Flow of Events:</p> <ol style="list-style-type: none"> 5. The admin, staff or student enters the system. 6. The admin, staff or student enters the email and password. 7. The admin, staff or student clicks the ‘Login’ button. <ol style="list-style-type: none"> 3.1 Verification of account is performed. (S-1) 8. The admin, staff or student login into the system. 		
<p>Subflows:</p> <p>S-1: Verification of account</p> <ol style="list-style-type: none"> 1. The system sends email and password to the server. 2. The system retrieves the password of the email from the database. 3. The system checks if the password entered by admin is correct. 4. The system checks if the account is verified. 5. The system proceeds to the home page. 		
<p>Alternate / Exceptional Flows:</p> <p>S-1, 2a: If the email does not exist in the database, an error message will be shown.</p> <p>S-1, 3a: If the password is incorrect, an error message will be shown.</p> <p>S-1, 4a: If the account is not verified, the system displays a resend email page</p>		

Table 4.3: View Found Item Use Case

Use Case Name: View Found Item	ID: 3	Importance Level: High
Primary Actor: Admin, Staff, Student	Use Case Type: Detail, essential	
<p>Stakeholders and Interests:</p> <p>Admin – wants to view all found items.</p> <p>Staff – wants to view all found items.</p> <p>Student – wants to view all found items.</p>		
<p>Brief Description: This use case describes how admin, staff or student views all found items.</p>		
<p>Trigger: Admin, staff or student enters the home page.</p> <p>Type: External</p>		
<p>Relationships:</p> <p>Association: Admin, Staff, Student</p> <p>Include: -</p> <p>Extend: -</p> <p>Generalization: -</p>		
<p>Normal Flow of Events:</p> <ol style="list-style-type: none"> 1. The admin, staff or student enter the home page. 2. The admin, staff or student select “Item Found” section. 3. The system displays all item found with detailed information. <ol style="list-style-type: none"> 3.1 If the current user is admin, the system displays all detailed information of the item in table format. 3.2 If the current user is staff or student, the system displays item image, date found and location found in multirow card format. 4. The system allows the staff or student to click the item to navigate to the detailed page. 5. The system displays item image, item name, item category, description, location found, date found and current status in the detailed page. <ol style="list-style-type: none"> 5.1 If the current user is staff or student, the system displays a “Claim” button. 5.2 If the current user is admin, the system does not display a “Claim” button. 		
Subflows:		
Alternate / Exceptional Flows:		

Table 4.4: View Lost Case Use Case

Use Case Name: View Lost Case	ID: 4	Importance Level: High
Primary Actor: Admin, Staff, Student	Use Case Type: Detail, essential	
<p>Stakeholders and Interests:</p> <p>Admin – wants to view all lost cases.</p> <p>Staff – wants to view all lost cases.</p> <p>Student – wants to view all lost cases.</p>		
<p>Brief Description: This use case describes how admin, staff or student views all lost cases.</p>		
<p>Trigger: Admin, staff or student enters the home page.</p> <p>Type: External</p>		
<p>Relationships:</p> <p>Association: Admin, Staff, Student</p> <p>Include: -</p> <p>Extend: -</p> <p>Generalization: -</p>		
<p>Normal Flow of Events:</p> <ol style="list-style-type: none"> 1. The admin, staff or student enter the home page. 2. The admin, staff or student select “Lost Case” section. 3. The system displays all lost cases with detailed information. <ol style="list-style-type: none"> 3.1 If the current user is admin, the system displays all detailed information of the item in table format. 3.2 If the current user is staff or student, the system displays item image, date lost and possible location in multirow card format 4. The system allows the staff or student to click the item to navigate to the detailed page. 5. The system displays item image, item name, item category, description, possible location, date lost, current status, and contact info of owner in the detailed page. 		
Subflows:		
Alternate / Exceptional Flows:		

Table 4.5: View Item for Sale Use Case

Use Case Name: View Item for Sale	ID: 5	Importance Level: High
Primary Actor: Admin, Staff, Student	Use Case Type: Detail, essential	
<p>Stakeholders and Interests:</p> <p>Admin – wants to view all items for sale.</p> <p>Staff – wants to view all items for sale.</p> <p>Student – wants to view all items for sale.</p>		
<p>Brief Description: This use case describes how admin, staff or student views all items for sale.</p>		
<p>Trigger: Admin, staff or student enters the home page.</p> <p>Type: External</p>		
<p>Relationships:</p> <p>Association: Admin, Staff, Student</p> <p>Include: -</p> <p>Extend: -</p> <p>Generalization: -</p>		
<p>Normal Flow of Events:</p> <ol style="list-style-type: none"> 1. The admin, staff or student enter the home page. 2. The admin, staff or student select “Item for Sale” section. 3. The system displays all items for sale with detailed information. <ol style="list-style-type: none"> 3.1 If the current user is admin, the system displays all detailed information of the item in table format. 3.2 If the current user is staff or student, the system displays item image and current bid price in multirow card format 4. The system allows the admin, staff or student to click the item to navigate to the detailed page. 5. The system displays item image, item name, item category, description, starting bid price, current bid price and bid end date in the detailed page. 6. The system displays all bids of the item in the detailed page. 		
Subflows:		
Alternate / Exceptional Flows:		

Table 4.6: View Announcement Use Case

Use Case Name: View Announcement	ID: 6	Importance Level: High
Primary Actor: Admin, Staff, Student	Use Case Type: Detail, essential	
<p>Stakeholders and Interests:</p> <p>Admin – wants to view all announcements.</p> <p>Staff – wants to view all announcements.</p> <p>Student – wants to view all announcements.</p>		
<p>Brief Description: This use case describes how admin, staff or student views all announcements.</p>		
<p>Trigger: Admin, staff or student enters the home page.</p> <p>Type: External</p>		
<p>Relationships:</p> <p>Association: Admin, Staff, Student</p> <p>Include: -</p> <p>Extend: -</p> <p>Generalization: -</p>		
<p>Normal Flow of Events:</p> <ol style="list-style-type: none"> 1. The admin, staff or student enter the home page. 2. The admin, staff or student select “Announcement” section. 3. The system displays date posted, announcement subject and department in table format 4. The system allows admin, staff or student to click the announcement subject to navigate to the detailed page 5. The system displays the announcement subject, announcement content and attachments in the detailed page. 6. The system allows admin, staff or student to click the attachment link to navigate to attachment page 7. The system displays the content of attachment file. 		
Subflows:		
Alternate / Exceptional Flows:		

Table 4.7: Claim Item Use Case

Use Case Name: Claim Item	ID: 7	Importance Level: High
Primary Actor: Staff, Student	Use Case Type: Detail, essential	
Stakeholders and Interests: Staff – wants to claim back the item. Student – wants to claim back the item.		
Brief Description: The use case describes how the staff or student claims back the item.		
Trigger: Staff or student clicks on the “Claim” button. Type: External		
Relationships: Association: Staff, Student Include: - Extend: - Generalization: -		
Normal Flow of Events: 1. The system displays the item information 2. The system displays the personal information of staff or student. 3. The staff or student select the claim date from date picker 4. The staff or student clicks on the “Submit” button 5. The system updates item status from “Available” to “Pending”.		
Subflows:		
Alternate / Exceptional Flows: 3a: If the staff or student select invalid claim date, an error message will be shown.		

Table 4.8: Report Lost Item Use Case

Use Case Name: Report Lost Item	ID: 8	Importance Level: High
Primary Actor: Staff, Student	Use Case Type: Detail, Essential	
Stakeholders and Interests: Staff - wants to report the lost item. Student - wants to report the lost item.		

Brief Description: The use case describes how the staff or student reports the lost item.
Trigger: Staff or student enters the home page Type: External
Relationships: Association: Staff, Student Include: - Extend: - Generalization: -
Normal Flow of Events: 1. The admin, staff or student enter the home page. 2. The admin, staff or student select “Report Your Lost” section. 3. The system displays a report form. 4. The staff or student enters the lost item information such as item name, item category, description, possible location lost and date lost. 5. The staff or student upload the item image 6. The student clicks on the “Submit” button. 7. The system updates a new lost case.
Subflows:
Alternate / Exceptional Flows: 4a: If the staff or student enters an invalid information, an error message will be shown.

Table 4.9: Bid Selling Item Use Case

Use Case Name: Bid Selling Item	ID: 9	Importance Level: High
Primary Actor: Staff, Student	Use Case Type: Detail, essential	
Stakeholders and Interests: Staff – wants to bid the selling item. Student – wants to bid the selling item.		
Brief Description: This use case describes how the staff or student bid the item.		
Trigger: Staff or student enters the detailed page of the item for sale Type: External		
Relationships:		

<p>Association: Staff, Student</p> <p>Include: -</p> <p>Extend: -</p> <p>Generalization: -</p>
<p>Normal Flow of Events:</p> <ol style="list-style-type: none"> 1. The system displays item image, item name, item category, description, starting bid price, current bid price and bid end date. 2. The staff or student enters a new bid amount. 3. The staff or student clicks on the “Bid” button. 4. The system displays a confirmation box 5. The staff or student selects “OK” 6. The system updates the new bid.
<p>Subflows:</p>
<p>Alternate / Exceptional Flows:</p> <p>2a: If the bid amount is lower than or equal to the current bid price, an error message will be shown.</p> <p>5a: If the staff or student selects “Cancel” for confirmation box, the system will cancel the new bid.</p>

Table 4.10: Manage Found Item Use Case

Use Case Name: Manage Found Item	ID: 10	Importance Level: High
Primary Actor: Admin	Use Case Type: Detail, essential	
<p>Stakeholders and Interests:</p> <p>Admin – wants to create, update and archive the found item.</p>		
<p>Brief Description: This use case describes how the admin creates, updates and archives the found item.</p>		
<p>Trigger:</p> <ol style="list-style-type: none"> 1. Admin clicks on the “Add New Item” button in the item found page. 2. Admin clicks on the edit icon of the item. 3. Admin clicks on the archive icon of the item. <p>Type: External</p>		
<p>Relationships:</p> <p>Association: Admin</p>		

Include: -

Extend: -

Generalization: -

Normal Flow of Events:

1. The system displays all item information in table format.
2. The system displays an “Add New Item” button in the home page.
 - 2.1 If the admin clicks on the “Add” button, add new item is performed. (S-1)
3. The system displays an edit icon on each item.
 - 2.1 If the admin clicks on the edit icon, edit item is performed. (S-2)
4. The system displays an archive icon each item.
5. 3.1 If the admin clicks on the archive icon, archive item is performed. (S-3)

Subflows:

S-1: Add New Item

1. The system displays an add new item form.
2. The admin enters item information such as item name, item category, description, location found, date found.
3. The admin uploads the item image.
4. The admin clicks on the “Submit” button.
5. The system updates a new item.

S-2: Edit Item

1. The system displays the item name, item category, description, location found, date found and the item image.
2. The system allows admin to select which information to edit.
 - 2.1 If the admin selects item name, the admin can enter a new item name in the text box.
 - 2.2 If the admin selects item category, the admin can select a new item category from the drop-down list.
 - 2.3 If the admin selects description, the admin can enter a new description in the text box.
 - 2.4 If the admin selects location found, the admin can enter a new location found in the text box.

<p>2.5 If the admin selects date found, the admin can enter a new date found in the text box.</p> <p>2.6 If the admin selects item image, the admin can upload a new item image.</p> <p>3. The admin clicks on the “Submit” button.</p> <p>4. The system updates the item with new details.</p> <p>S-3: Archive Item</p> <p>1. The system displays the confirmation dialog box.</p> <p>1.1 If the admin selects “OK”, the item is archived from the system.</p> <p>1.2 If the admin selects “Cancel”, the archive action is cancelled.</p>
<p>Alternate / Exceptional Flows:</p> <p>S-1, 2a: If the admin enters invalid information, an error message will be shown.</p> <p>S-2, 2a: If the admin enters invalid information, an error message will be shown.</p>

Table 4.11: Manage Claim Use Case

Use Case Name: Manage Claim	ID: 11	Importance Level: High
Primary Actor: Admin	Use Case Type: Detail, essential	
Stakeholders and Interests:		
Admin – wants to view, update and archive claim records.		
Brief Description: This use case describes how the admin views, updates and archives claim records.		
Trigger:		
<ol style="list-style-type: none"> 1. Admin enters the claim record page. 2. Admin clicks on the “Claimed” button of the claim record. 3. Admin clicks on the “Archive” button of the claim record. 		
Type: External		
Relationships:		
Association: Admin		
Include: -		
Extend: -		
Generalization: -		
Normal Flow of Events:		
<ol style="list-style-type: none"> 1. The system displays all the claim records in the claim record page. 2. The system displays an “Claimed” button on each pending claim record. 		

<p>2.1 If the admin clicks on the “Claimed” button, claim item is performed. (S-1)</p> <p>3. The system displays an archive icon on each claim record.</p> <p>3.1 If the admin clicks on the archive icon, archive claim record is performed. (S-2)</p>
<p>Subflows:</p> <p>S-1: Claim Item</p> <ol style="list-style-type: none"> 1. The system displays the item information 2. The system displays the information of the person who claim the item. 3. The admin clicks “Confirm” button. 4. The system changes the claim status from “Pending” to “Claimed” <p>S-2: Archive Claim Record</p> <ol style="list-style-type: none"> 1. The system displays the confirmation dialog box. <ol style="list-style-type: none"> 1.1 If the admin selects “Yes”, the claim record is archived from the system. 1.2 If the admin selects “No”, the archive action is cancelled.
<p>Alternate / Exceptional Flows:</p>

Table 4.12: Manage Item for Sale Use Case

Use Case Name: Manage Item for Sale	ID: 12	Importance Level: High
Primary Actor: Admin	Use Case Type: Detail, Essential	
Stakeholders and Interests: Admin – wants to manage item for sale.		
Brief Description: The use case describes how the admin manages items for sale.		
Trigger: Admin enters the item for sale page Type: External		
Relationships: Association: Admin Include: - Extend: - Generalization: -		
Normal Flow of Events: <ol style="list-style-type: none"> 1. The system displays all the expired items. 2. The system displays “Approve for Sale” button for each expired item. 		

2.1 If the admin clicks on the “Approve for Sale” button, approve for sale is performed. (S-1)

3. The admin displays an archive button for each expired item.

3.1 If the admin clicks on the archive icon, archive expired item is performed. (S-2)

4. The system displays all items for sale.

5. The system displays an edit icon for each item for sale.

5.1 If the admin clicks on the edit icon, edit item for sale is performed. (S-3)

6. The system displays an archive icon for each item for sale.

6.1 If the admin clicks on the archive icon, archive item for sale is performed. (S-4)

7. The system displays “View all bids” button for each item for sale.

7.1 If the admin clicks on the “View all bids” button, view all bids is performed. (S-5)

Subflows:

S-1: Approve for Sale

1. The system displays expired item information.
2. Admin enters the starting bid price and bid end date.
3. Admin clicks on the “Submit” button.
4. The system updates the item status from “Expired” to “Selling”

S-2: Archive Expired Item

1. The system displays the confirmation dialog box.
 - 1.1 If the admin selects “Yes”, the expired item is archived from the system.
 - 1.2 If the admin selects “No”, the archive action is cancelled.

S-3: Edit Item for Sale

1. The system displays starting bid price and bid end date of the item for sale.
2. The system allows admin to select which information to edit.
 - 2.1 If the admin selects the starting bid, the admin can enter a new starting bid in the text box.
 - 2.2 If the admin selects the bid end date, the admin can enter a new bid end date.

S-4: Archive Item for Sale

1. The system displays the confirmation dialog box.

<p>1.1 If the admin selects “Yes”, the item for sale is archived from the system.</p> <p>1.2 If the admin selects “No”, the archive action is cancelled.</p>
<p>Alternate / Exceptional Flows:</p> <p>S-1, 2a: If the admin enters invalid information, an error message will be shown.</p> <p>S-3, 2a: If the admin enters invalid information, an error message will be shown.</p>

Table 4.13: Manage Announcement Use Case

Use Case Name: Manage Announcement	ID: 13	Importance Level: High
Primary Actor: Admin	Use Case Type: Detail, essential	
Stakeholders and Interests:		
Admin – wants to post, update and archive the announcement		
Brief Description: This use case describes how the admin posts, updates and archives the announcement.		
Trigger:		
<ol style="list-style-type: none"> 1. Admin clicks on the “Post New Announcement” button in the announcement page. 2. Admin clicks on the edit icon of the announcement. 3. Admin clicks on the archive icon of the announcement. 		
Type: External		
Relationships:		
Association: Admin		
Include: -		
Extend: -		
Generalization: -		
Normal Flow of Events:		
<ol style="list-style-type: none"> 1. The system displays all announcements in table format. 2. The system displays an “Post New Announcement” button in the home page. <ol style="list-style-type: none"> 2.1 If the admin clicks on the “Post New Announcement” button, post new announcement is performed. (S-1) 3. The system displays an edit icon on each announcement <ol style="list-style-type: none"> 2.1 If the admin clicks on the edit icon, edit announcement is performed. (S-2) 4. The system displays an archive icon each announcement. 		

5. 3.1 If the admin clicks on the archive icon, archive announcement is performed. (S-3)
<p>Subflows:</p> <p>S-1: Post New Announcement</p> <ol style="list-style-type: none"> 1. The system displays a post new announcement form. 2. The admin enters announcement subject and content. 3. The admin uploads the attachment. 4. The admin clicks on the “Post” button. 5. The system updates a new announcement. <p>S-2: Edit Announcement</p> <ol style="list-style-type: none"> 1. The system displays the announcement subject and content. 2. The system allows admin to select which information to edit. <ol style="list-style-type: none"> 2.1 If the admin selects announcement subject, the admin can enter a new announcement subject. 2.2 If the admin selects announcement content, the admin can enter a new announcement content 2.3 If the admin selects announcement attachment, the admin can upload a new attachment. 3. The admin clicks on the “Submit” button. 4. The system updates the announcement with new details. <p>S-3: Archive Item</p> <ol style="list-style-type: none"> 1. The system displays the confirmation dialog box. <ol style="list-style-type: none"> 1.3 If the admin selects “OK”, the announcement is archived from the system. 1.4 If the admin selects “Cancel”, the archive action is cancelled.
<p>Alternate / Exceptional Flows:</p> <p>S-1, 2a: If the admin enters invalid information, an error message will be shown.</p> <p>S-2, 2a: If the admin enters invalid information, an error message will be shown.</p>

Table 4.14: Manage Staff Admin Account Use Case

Use Case Name: Manage Staff Admin Account	ID: 14	Importance Level: High
Primary Actor: System Admin	Use Case Type: Detail, essential	
Stakeholders and Interests:		

System Admin – wants to create, update and delete staff admin account.
Brief Description: This use case describes how the system admin posts, updates and deletes the staff admin account.
<p>Trigger:</p> <ol style="list-style-type: none"> 1. System admin clicks on the “Create New Staff Account” button in the staff admin account page. 2. System admin clicks on the edit icon of the staff admin account. 3. System admin clicks on the archive icon of the staff admin account. <p>Type: External</p>
<p>Relationships:</p> <p>Association: System Admin</p> <p>Include: -</p> <p>Extend: -</p> <p>Generalization: -</p>
<p>Normal Flow of Events:</p> <ol style="list-style-type: none"> 1. The system displays all staff admin account in table format. 2. The system displays an “Create New Staff Account” button in the home page. <ol style="list-style-type: none"> 2.1 If the system admin clicks on the “Create New Staff Account” button, create new staff admin account is performed. (S-1) 3. The system displays an edit icon on each staff admin account <ol style="list-style-type: none"> 2.1 If the system admin clicks on the edit icon, edit staff admin account is performed. (S-2) 4. The system displays a delete icon each staff admin account. 5. 3.1 If the system admin clicks on the delete icon, delete staff admin account is performed. (S-3)
<p>Subflows:</p> <p>S-1: Create New Staff Admin Account</p> <ol style="list-style-type: none"> 1. The system displays a create new staff account form. 2. The system admin enters staff department, name, email and contact number. 3. The system admin clicks on the “Submit” button. 4. The system admin creates a new staff admin account. <p>S-2: Edit New Staff Admin Account</p>

<ol style="list-style-type: none"> 1. The system displays the department, name, email and contact number. 2. The system allows system admin to select which information to edit. <ol style="list-style-type: none"> 2.4 If the system admin selects department, the system admin can enter a new department. 2.5 If the system admin selects name, the system admin can enter a new name. 2.6 If the system admin selects email, the system admin can upload a new email. 2.7 If the system admin selects contact number, the system admin can upload a new contact number. 3. The system admin clicks on the “Submit” button. 4. The system updates the user account with new details. <p>S-3: Delete Staff Admin Account</p> <ol style="list-style-type: none"> 2. The system displays the confirmation dialog box. <ol style="list-style-type: none"> 1.5 If the system admin selects “OK”, the user account is deleted from the system. 1.6 If the system admin selects “Cancel”, the delete action is cancelled.
<p>Alternate / Exceptional Flows:</p> <p>S-1, 2a: If the system admin enters invalid information, an error message will be shown.</p> <p>S-2, 2a: If the system admin enters invalid information, an error message will be shown.</p>

Table 4.15: Customize Item Category Use Case

Use Case Name: Customize Item Category	ID: 15	Importance Level: High
Primary Actor: System Admin	Use Case Type: Detail, essential	
Stakeholders and Interests:		
System Admin – wants to create, update and delete item category.		
Brief Description: This use case describes how the system admin creates, updates and deletes the item category		
Trigger:		
<ol style="list-style-type: none"> 1. System admin clicks on the “Add New Item Category” button in the item category page. 		

<ol style="list-style-type: none"> 2. System admin clicks on the edit icon of the item category. 3. System admin clicks on the archive icon of the item category. <p>Type: External</p>
<p>Relationships:</p> <p>Association: System Admin</p> <p>Include: -</p> <p>Extend: -</p> <p>Generalization: -</p>
<p>Normal Flow of Events:</p> <ol style="list-style-type: none"> 1. The system displays all item categories in table format. 2. The system displays an “Add New Item Category” button in the home page. <ol style="list-style-type: none"> 2.1 If the system admin clicks on the “Add New Item Category” button, create new item category is performed. (S-1) 3. The system displays an edit icon on each item category. <ol style="list-style-type: none"> 2.1 If the system admin clicks on the edit icon, edit item category is performed. (S-2) 4. The system displays a delete icon each item category. 5. 3.1 If the system admin clicks on the delete icon, delete item category is performed. (S-3)
<p>Subflows:</p> <p>S-1: Create New Item Category</p> <ol style="list-style-type: none"> 1. The system admin enters new item category. 2. The system admin clicks on the “Submit” button. 3. The system admin creates a new item category <p>S-2: Edit New Item Category</p> <ol style="list-style-type: none"> 1. The system displays current item category. 2. The system admin enters a new item category. 3. The system admin clicks on the “Submit” button. 4. The system updates the item category. <p>S-3: Delete Item Category</p> <ol style="list-style-type: none"> 3. The system displays the confirmation dialog box. <ol style="list-style-type: none"> 1.7 If the system admin selects “OK”, the item category is deleted from the system.

1.8 If the system admin selects “Cancel”, the delete action is cancelled.

Alternate / Exceptional Flows:

S-1, 2a: If the system admin enters invalid information, an error message will be shown.

S-2, 2a: If the system admin enters invalid information, an error message will be shown.

CHAPTER 5

SYSTEM DESIGN

5.1 Introduction

In this chapter, system architecture design, navigation design and database design will be discussed based on the functional requirements which are determined in the previous chapter. Furthermore, the activity diagram will also be illustrated in the following section to show the system flow.

5.2 System Architecture Design

Figure 5.1 shows the architecture design of UTAR lost and found management system. It implements the Model-View-Controller (MVC) framework as the structure of system. It means the system architecture is separated into 3 main components which are model, view and controller.

Web browser and mobile acts as view in MVC framework, which is the client-side that displays the data on the user interface. Application Programming Interface (API) acts as a controller to handle all CRUD operations from the user interface. Furthermore, MySQL database acts as the model to manage all data as well as the relationship between the database table.

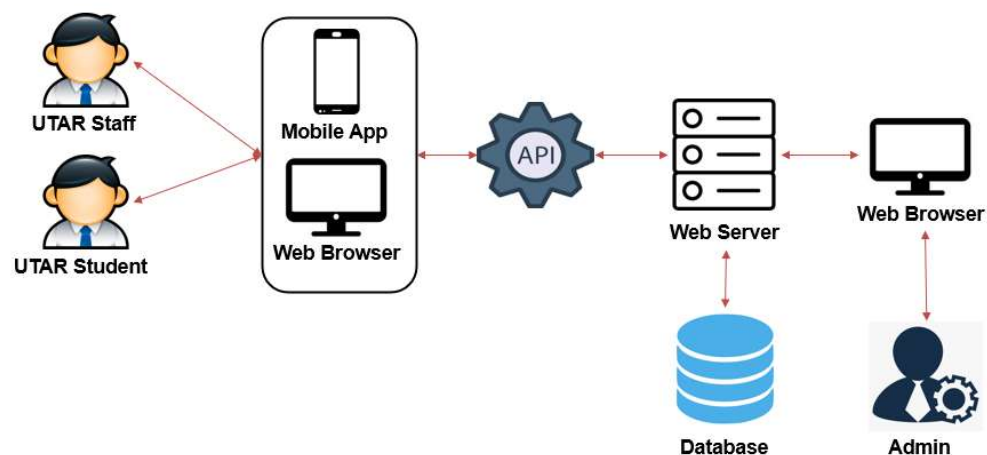


Figure 5.1: System Architecture Design

5.3 User Interface Navigation Design

The navigation design shows the ways of the user to navigate through the system. The root page of the system starts from the login page. After the user login into the system, they will be redirected to their homepage. The homepage displays links to various pages so users can perform different operations to the database. Figure 5.2 and Figure 5.3 illustrate the navigation design for both web and mobile platforms.

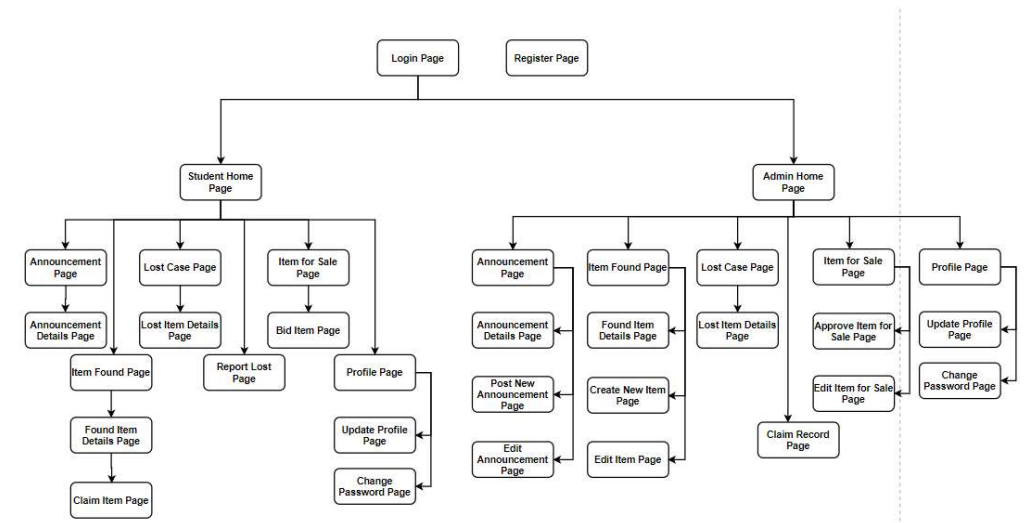


Figure 5.2: Navigation Design for Web

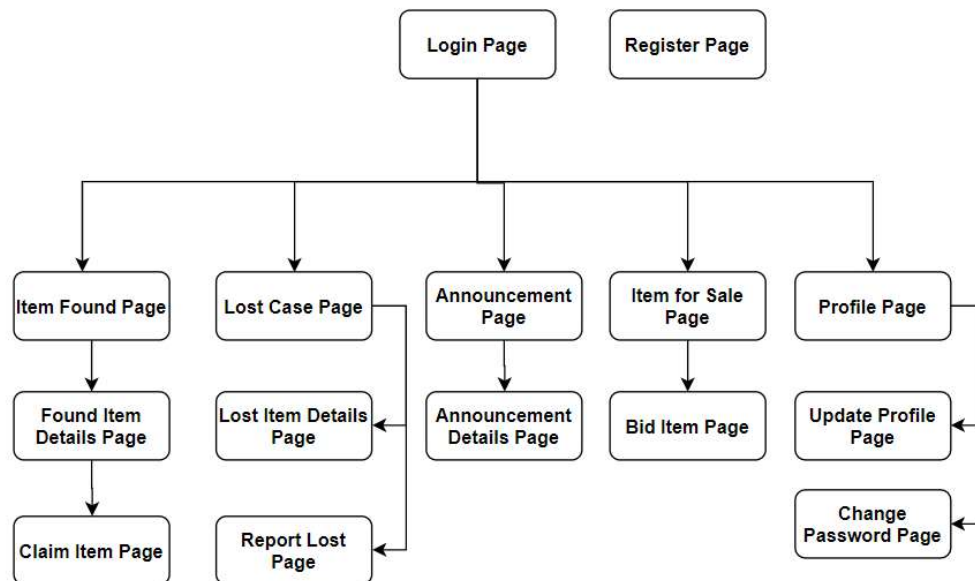


Figure 5.3: Navigation Design for Mobile

5.4 Database Design

5.4.1 Entity Relationship Diagram

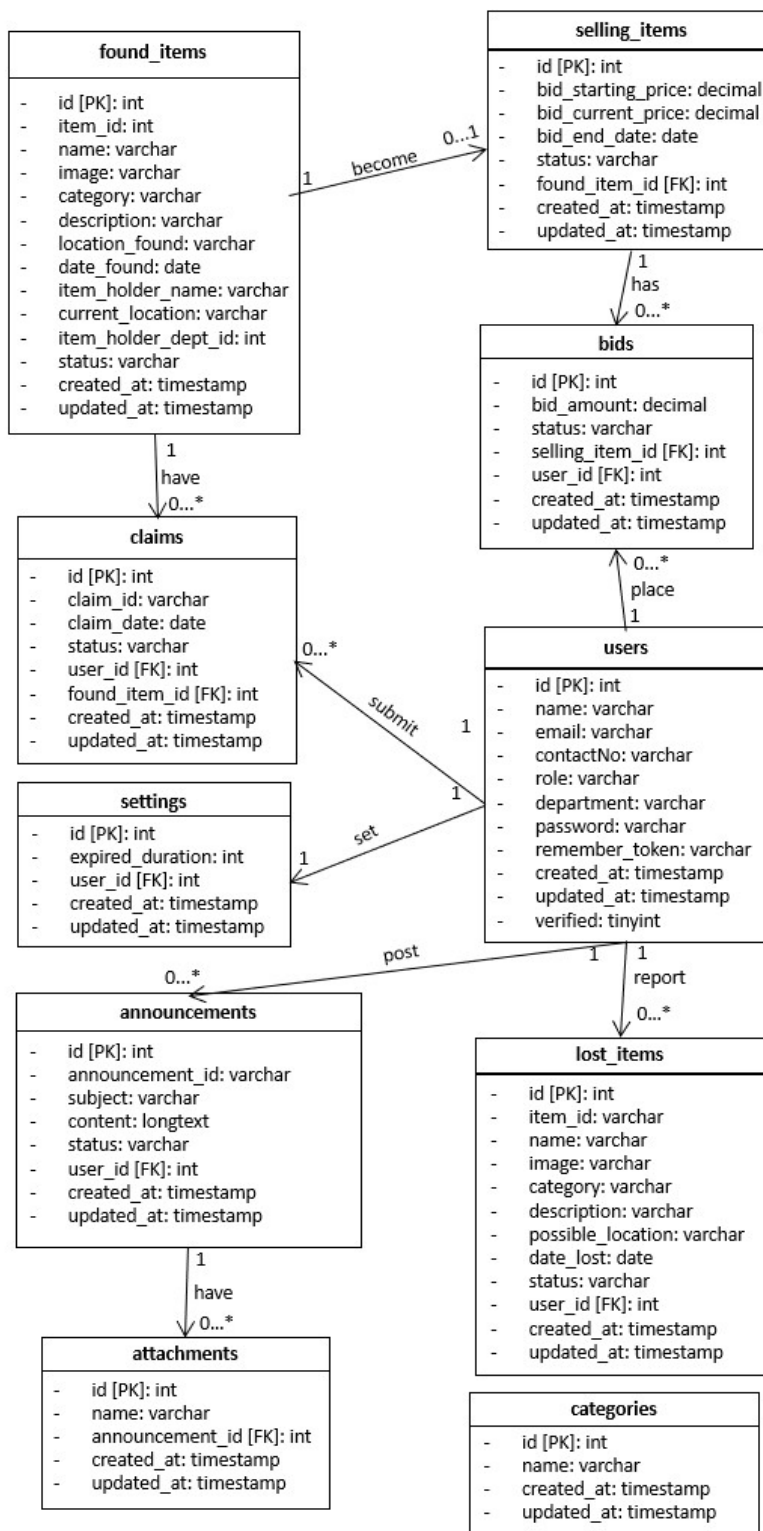


Figure 5.4: Entity Relationship Diagram

Table 5.1: Description of Entity Relationship Diagram

Table Name	Description
users	Information about all system users, which are system admin, UTAR staff and UTAR students
found_items	Information about all found items
claims	Information about all claim record of the found items
lost_items	Information about all report cases of lost item
selling_items	Information about all expired items for sell
bids	Information about all bids of the selling items
announcements	Information about all announcements posted
attachments	Information about all attachments of the announcements
settings	Information about all account settings
categories	Information about all item categories

5.4.2 Data Dictionary

Table 5.2: Data Dictionary for 'users' Entity

Attribute	Description	Data Type	PK/FK	NULL
id	Unique identification for all system users	int	PK	
name	Name of system users	varchar		
email	Email of system users	varchar		
contactNo	Contact Number of system users	varchar		
role	Role of system users	varchar		
department	Department of system users	varchar		√
password	Password for the system users to login	varchar		
remember_token	'Remember me' function which keep the user authenticated until they manually logout	varchar		√
created_at	Timestamp when the user account was first created	timestamp		√

updated_at	Timestamp of the most recent change to the record	timestamp		√
verified	Status of email verification	tinyint		

Table 5.3: Data Dictionary for 'found_items' Entity

Attribute	Description	Data Type	PK/FK	NULL
id	Unique identification for all found items	int	PK	
item_id	Unique identification for all found items in user view	varchar		
name	Name of the found item	varchar		
image	Image path of the found item	varchar		
category	Category of the found item	varchar		
description	Description of the found item	varchar		
location_found	Location of the item found	varchar		
date_found	Date for the item found	varchar		
item_holder_name	Name of the person who currently hold the item	varchar		
current_location	Currently location of the item	varchar		
item_holder_dept_id	User who create the found item record	varchar	FK	
status	Current status of the item found	varchar		
created_at	Timestamp when the found item record was first created	timestamp		√
updated_at	Timestamp of the most recent change to the found item record	timestamp		√

Table 5.4: Data Dictionary for 'claims' Entity

Attribute	Description	Data Type	PK/FK	NULL
id	Unique identification for all claim records	int	PK	
claim_id	Unique identification for all claim records in user view	varchar		
claim_date	Date for the owner to claim back their item	date		
status	Current status of the claim record	varchar		
user_id	Item owner	int		
found_item_id	Item to be claimed	int	FK	
created_at	Timestamp when the claim record was first created	timestamp		√
updated_at	Timestamp of the most recent change to the claim record	timestamp		√

Table 5.5: Data Dictionary for 'lost_items Entity

Attribute	Description	Data Type	PK/FK	NULL
id	Unique identification for all report cases	int	PK	
item_id	Unique identification for all report cases in user view	varchar		
name	Name of the lost item	varchar		
image	Image path of the lost item	varchar		
category	Category of the lost item	varchar		
description	Description of the lost item	varchar		
possible_location	Possible location of the lost item	varchar		
date_lost	Date for the item lost	varchar		
status	Current status of the lost item	varchar		
user_id	User who report lost item	int	FK	

created_at	Timestamp when the report case record was first created	timestamp		√
updated_at	Timestamp of the most recent change to the report case record	timestamp		√

Table 5.6: Data Dictionary for 'selling_items' Entity

Attribute	Description	Data Type	PK/FK	NULL
id	Unique identification for selling items	int	PK	
bid_starting_price	Starting price of the selling item	decimal		
bid_current_price	Current price of the selling item	decimal		
bid_end_date	End date of the auction	date		
status	Current status of the selling item	varchar		
found_item_id	Found item of the selling item belongs to	int	FK	
created_at	Timestamp when the selling item record was first created	timestamp		√
updated_at	Timestamp of the most recent change to the selling item record	timestamp		√

Table 5.7: Data Dictionary for 'bids' Entity

Attribute	Description	Data Type	PK/FK	NULL
id	Unique identification for all bids for the items	int	PK	
bid_amount	Amount of the bid for the item	decimal		
status	Current status of the bid	varchar		
selling_item_id	Selling item of the bid belong to	int	FK	

user_id	User who place the bid	int	FK	
created_at	Timestamp when the bid record was first created	timestamp		√
updated_at	Timestamp of the most recent change to the bid record	timestamp		√

Table 5.8: Data Dictionary for ‘announcements Entity

Attribute	Description	Data Type	PK/FK	NULL
id	Unique identification for all announcements	int	PK	
announcement_id	Unique identification for all announcements in user view	varchar		
subject	Title of the announcement	varchar		
content	Content of the announcement	longtext	FK	
status	Current status of the announcement	varchar		
user_id	User who post the announcement	int	FK	
created_at	Timestamp when the announcement record was first created	timestamp		√
updated_at	Timestamp of the most recent change to the announcement record	timestamp		√

Table 5.9: Data Dictionary for ‘attachments’ Entity

Attribute	Description	Data Type	PK/FK	NULL
id	Unique identification for attachments in the announcements	int	PK	
name	Path of the attachment	varchar		

announcement_id	Announcement of the attachment belongs to	int	FK	
created_at	Timestamp when the attachment record was first created	timestamp		√
updated_at	Timestamp of the most recent change to the attachment record	timestamp		√

Table 5.10: Data Dictionary for 'settings Entity

Attribute	Description	Data Type	PK/FK	NULL
id	Unique identification for all settings by system users	int	PK	
expired_duration	Customized duration for the item to be expired	int		
user_id	User who create the setting	int	FK	
created_at	Timestamp when the setting record was first created	timestamp		√
updated_at	Timestamp of the most recent change to the setting record	timestamp		√

Table 5.11: Data Dictionary for 'categories Entity

Attribute	Description	Data Type	PK/FK	NULL
id	Unique identification for all item categories	int	PK	
name	Name of item category	varchar		
created_at	Timestamp when the categories record was first created	timestamp		√
updated_at	Timestamp of the most recent change to the categories record	timestamp		√

5.5 Activity Diagram

The objective of the activity diagram is to illustrate the user flow of UTAR lost and found management system. In the following section, there are 15 activity diagrams which represent different features of UTAR lost and found management system.

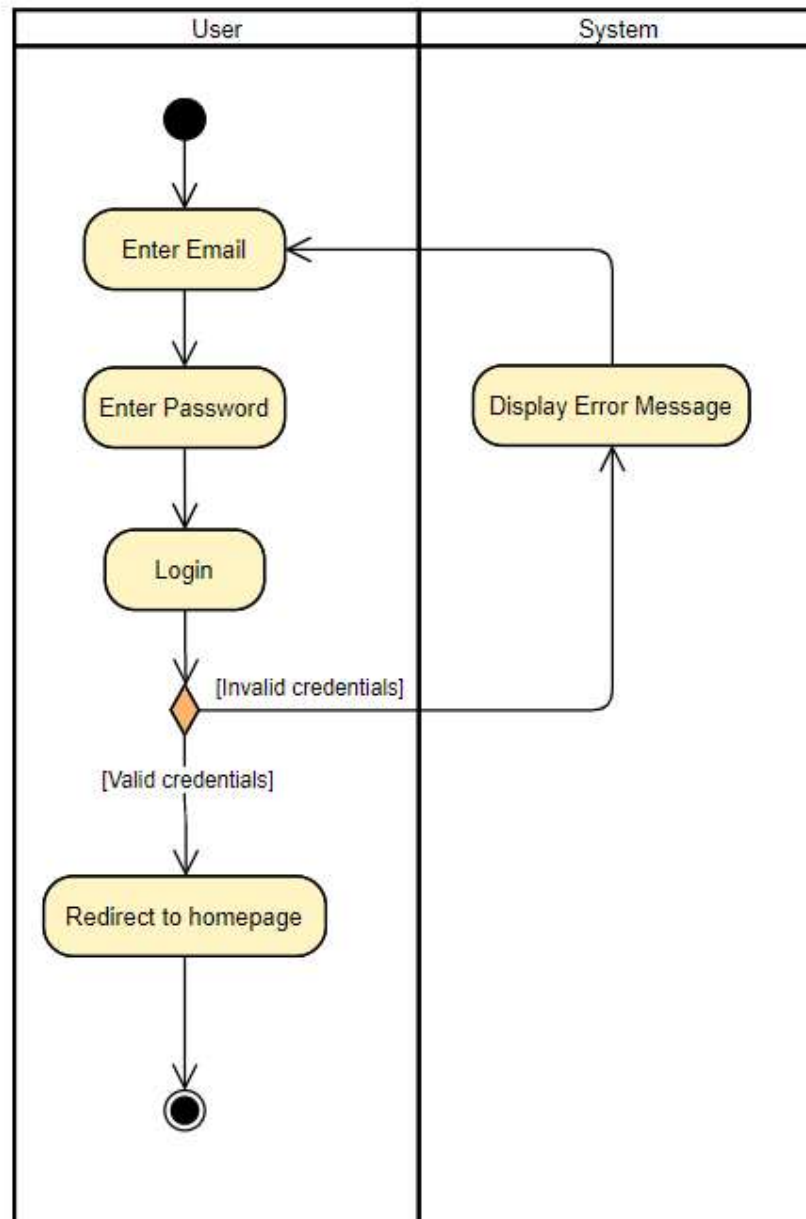


Figure 5.5: Activity Diagram : Login

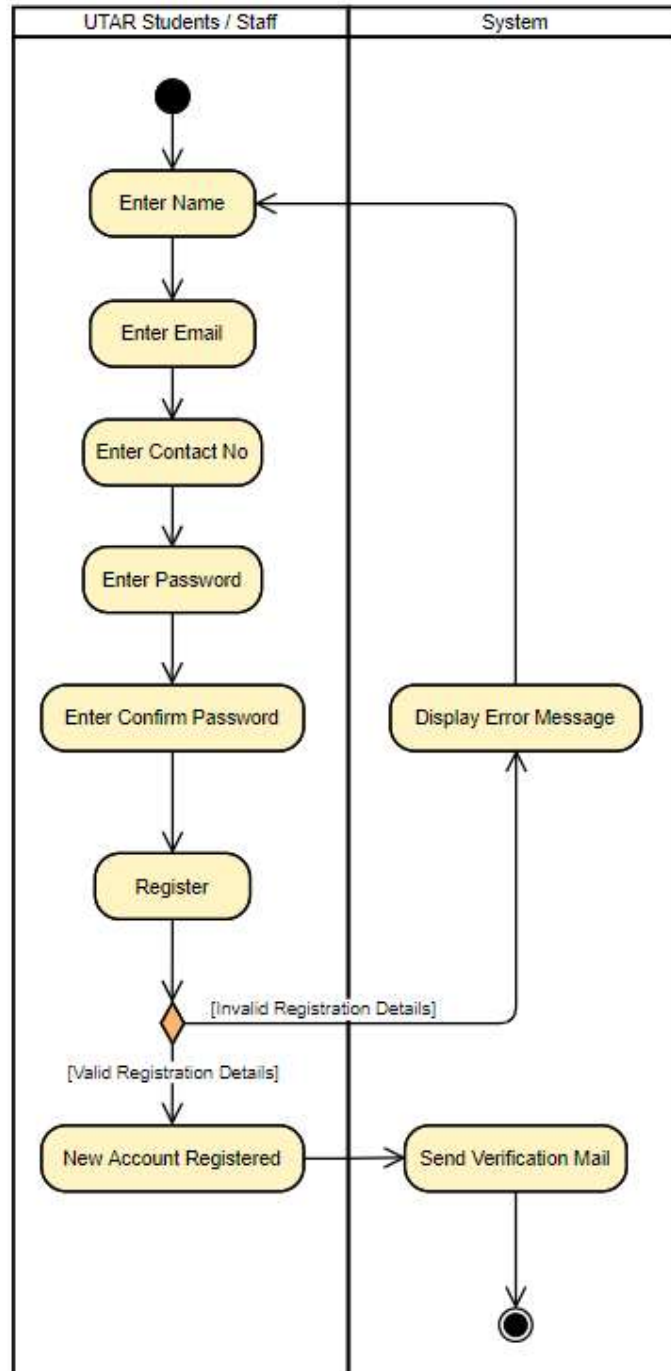


Figure 5.6: Activity Diagram : Register

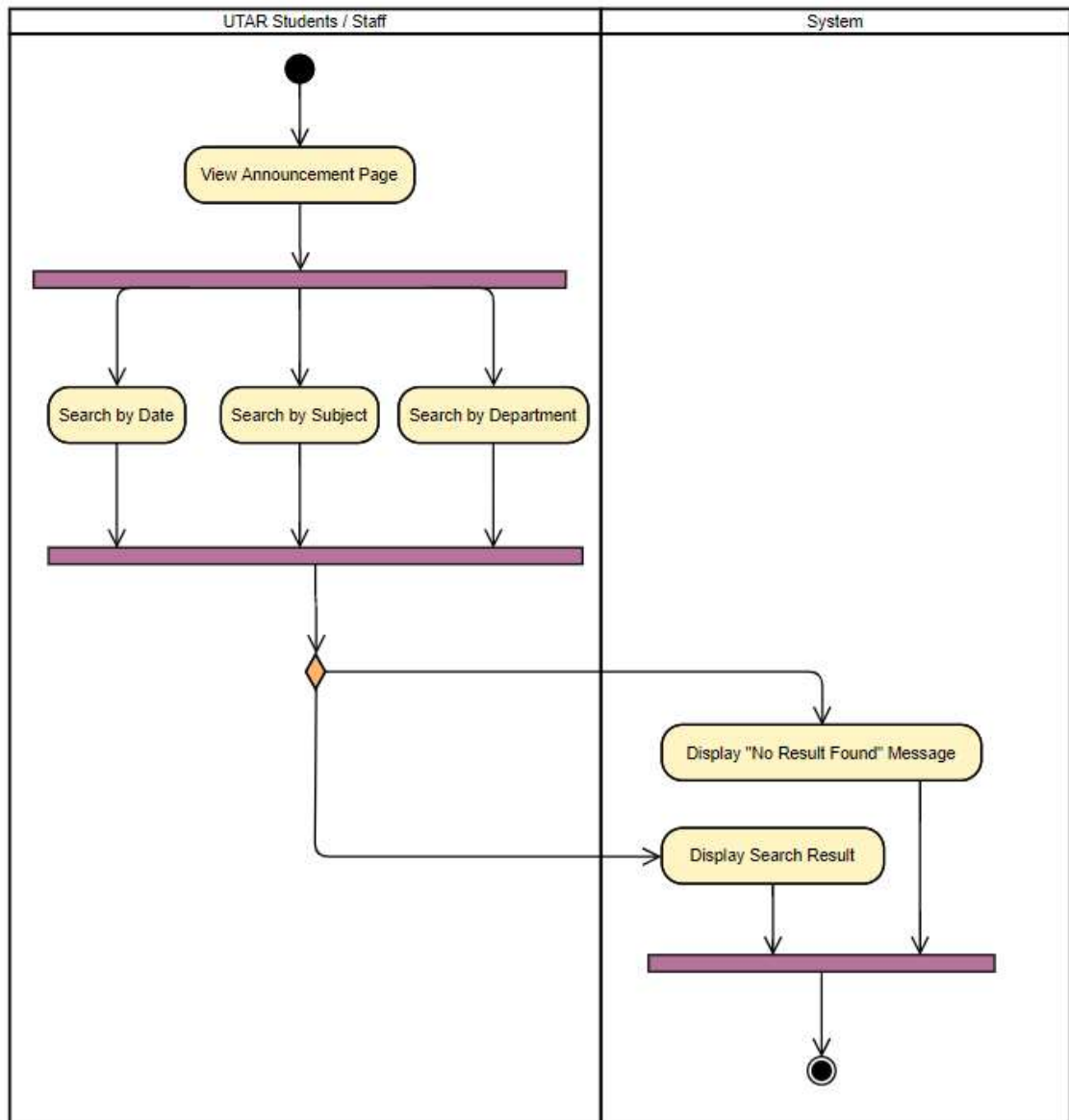


Figure 5.7: Activity Diagram : View and Search Announcement

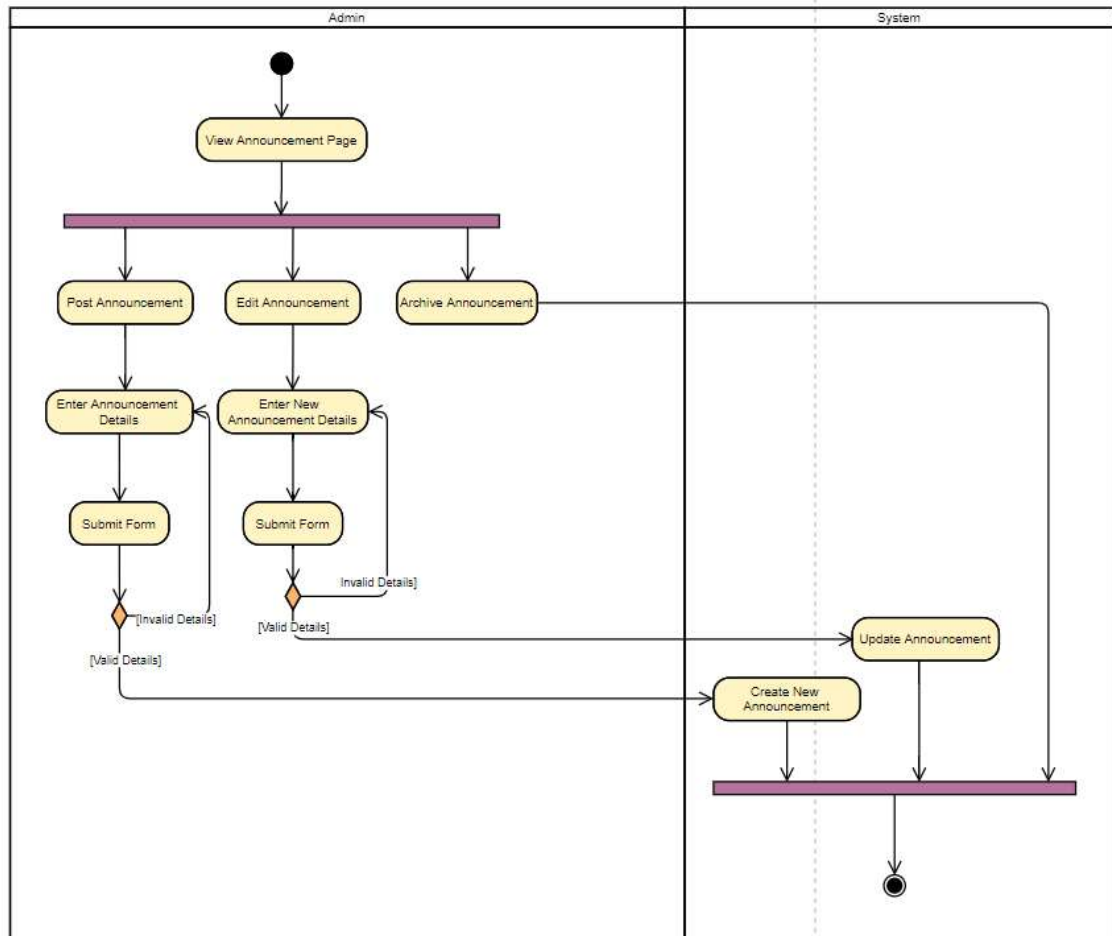


Figure 5.8: Activity Diagram : Manage Announcement

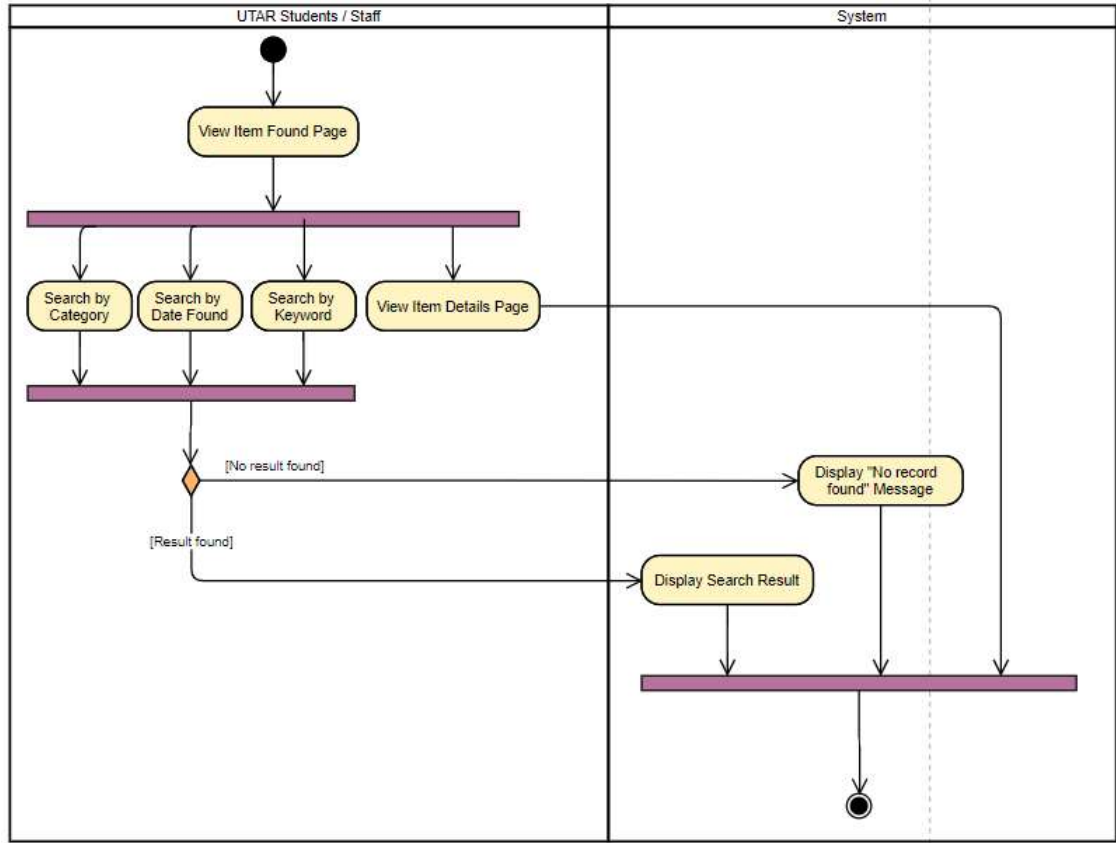


Figure 5.9: Activity Diagram : View and Search Found Item

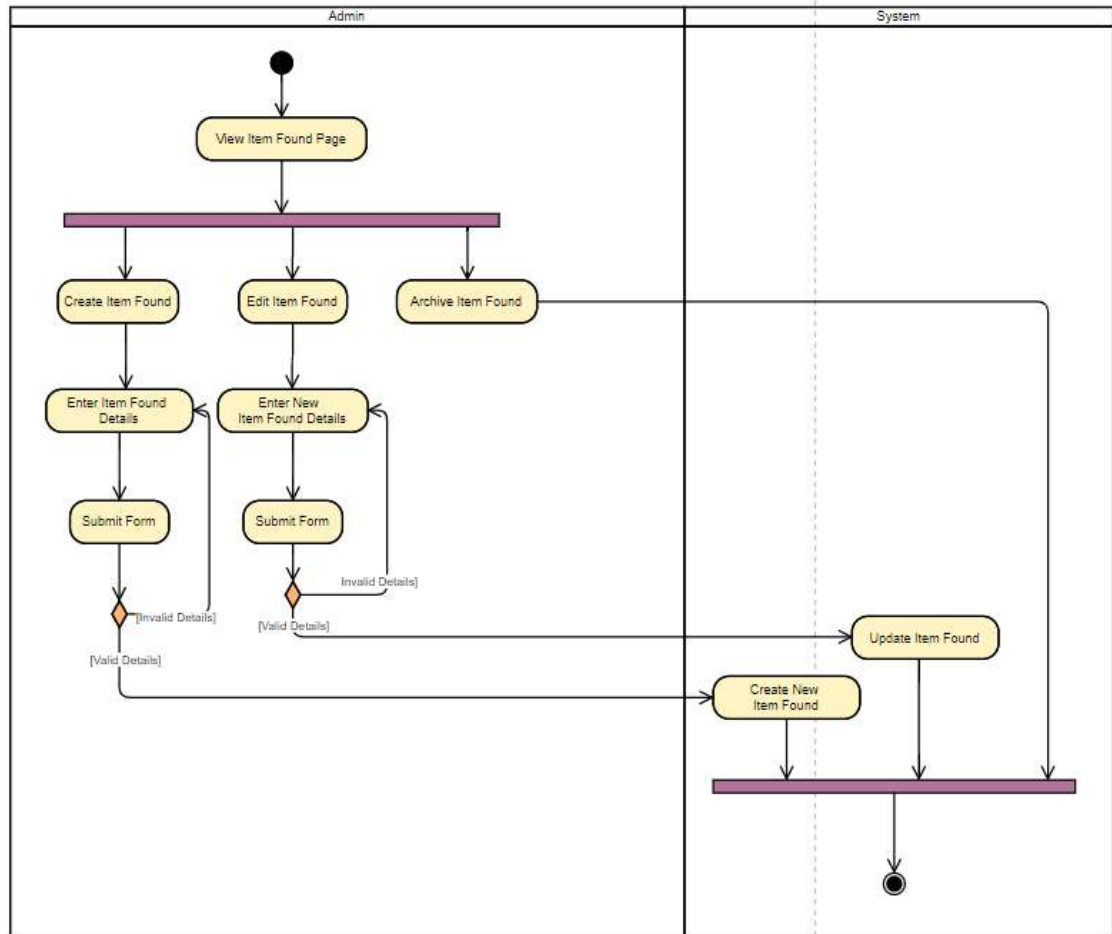


Figure 5.10: Activity Diagram : Manage Item Found

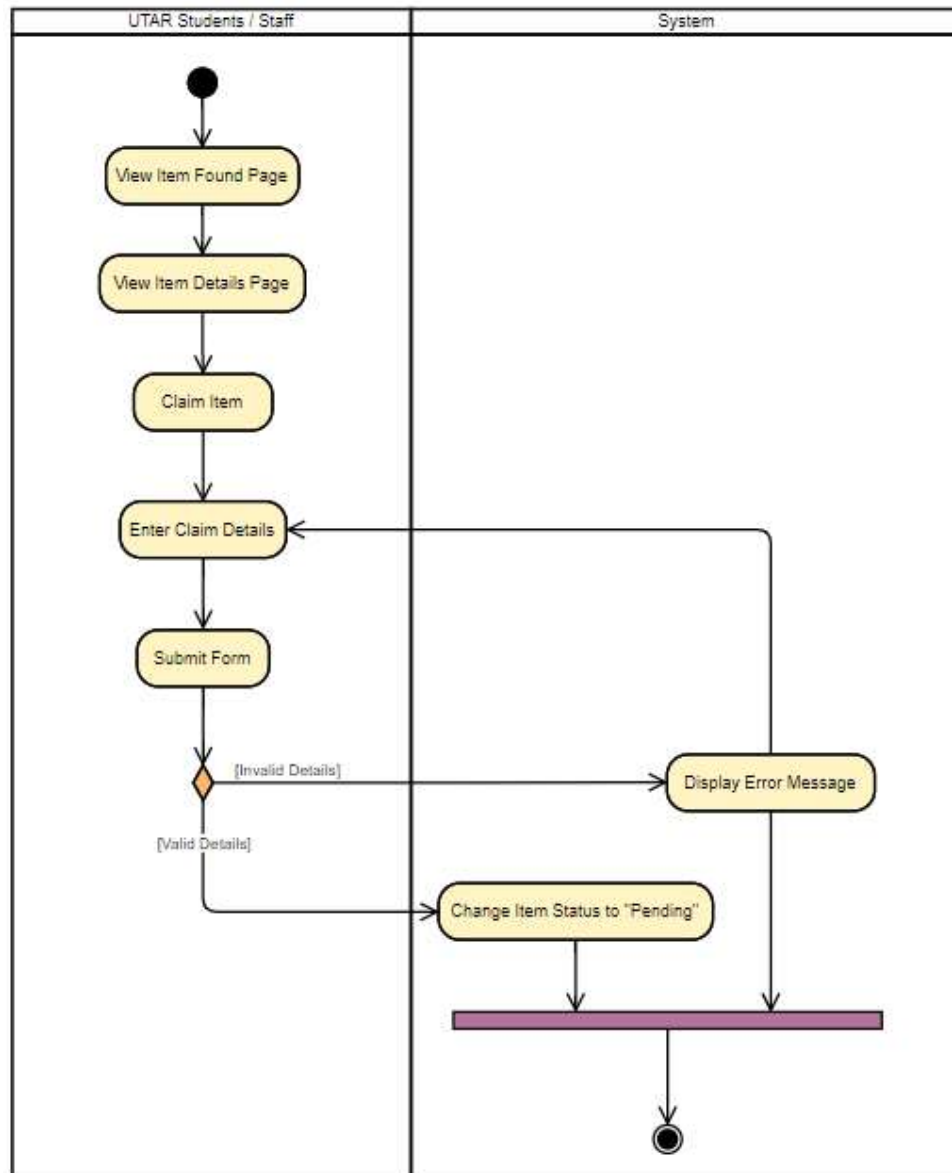


Figure 5.11: Activity Diagram : Claim Item

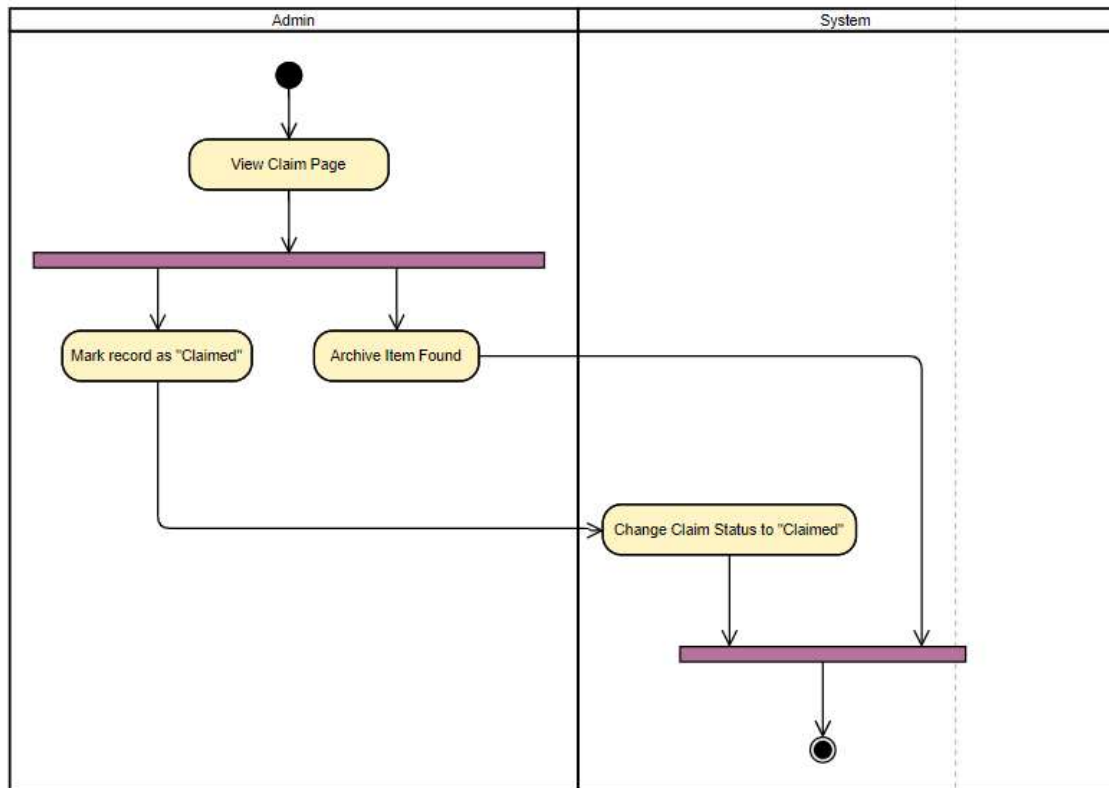


Figure 5.12: Activity Diagram : Manage Claim

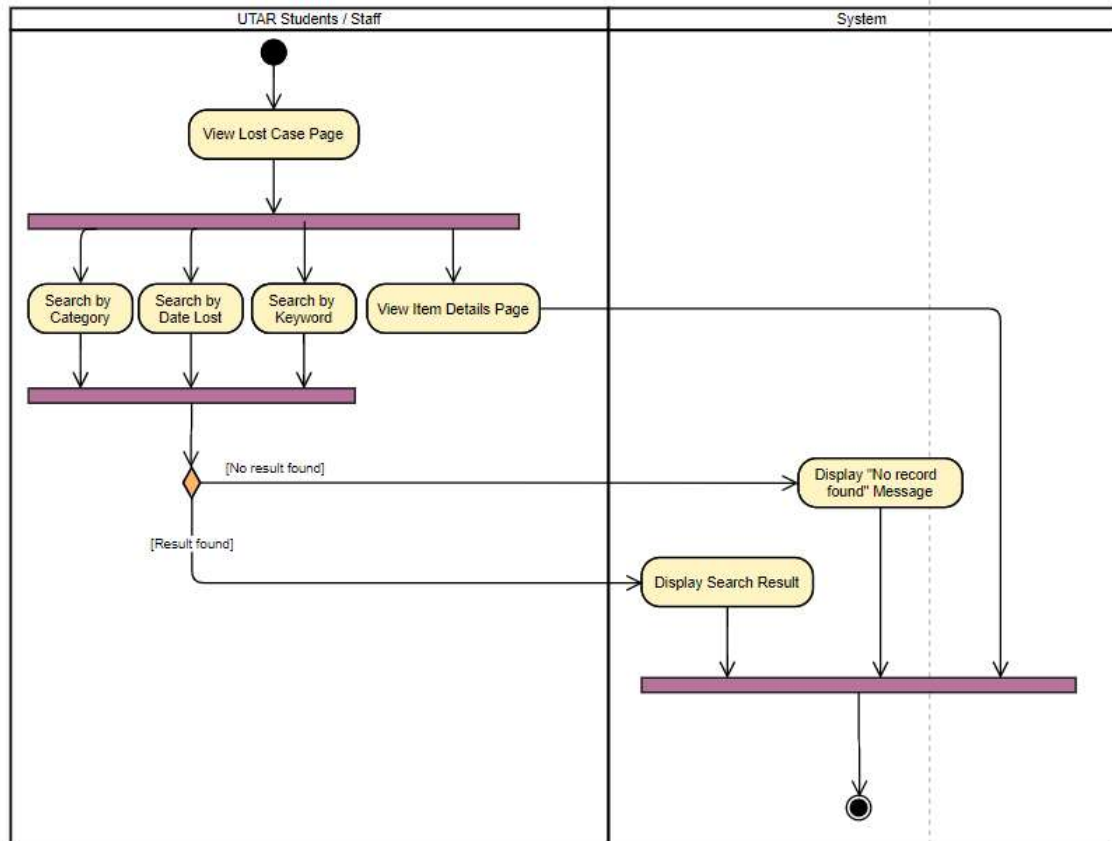


Figure 5.13: Activity Diagram : View Lost Case

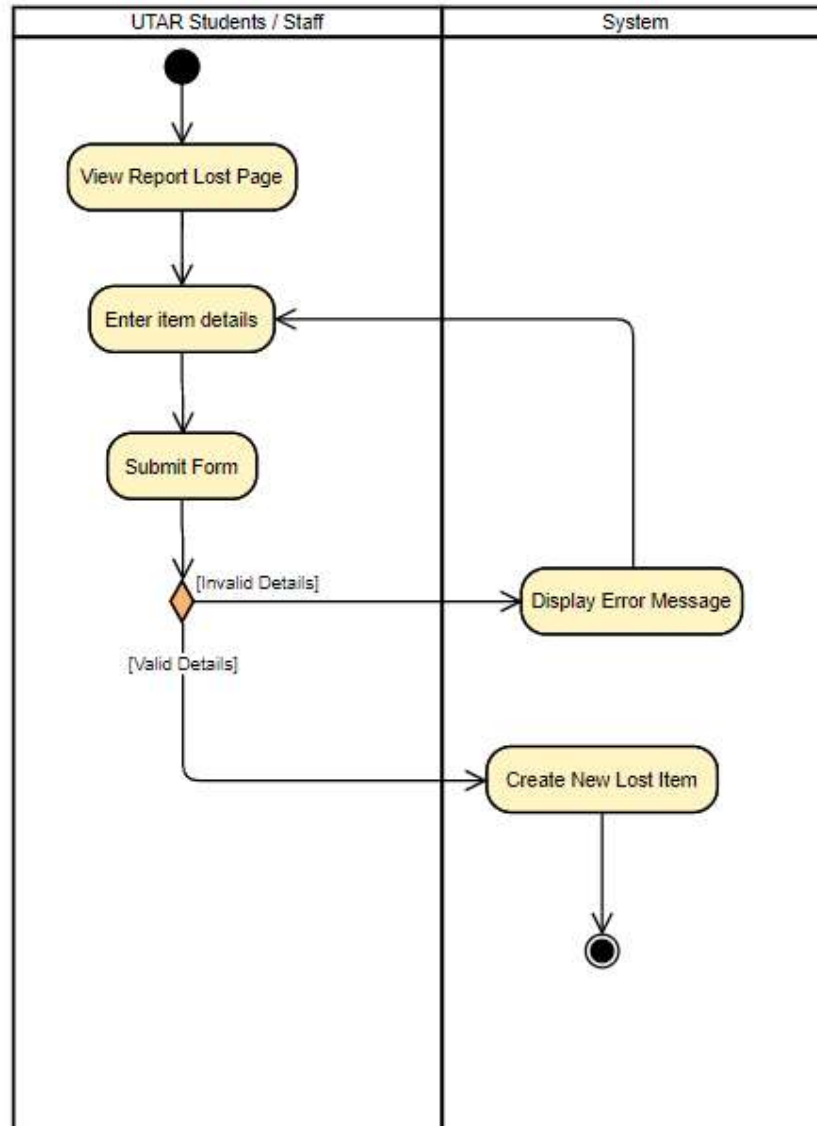


Figure 5.14: Activity Diagram : Report Lost Item

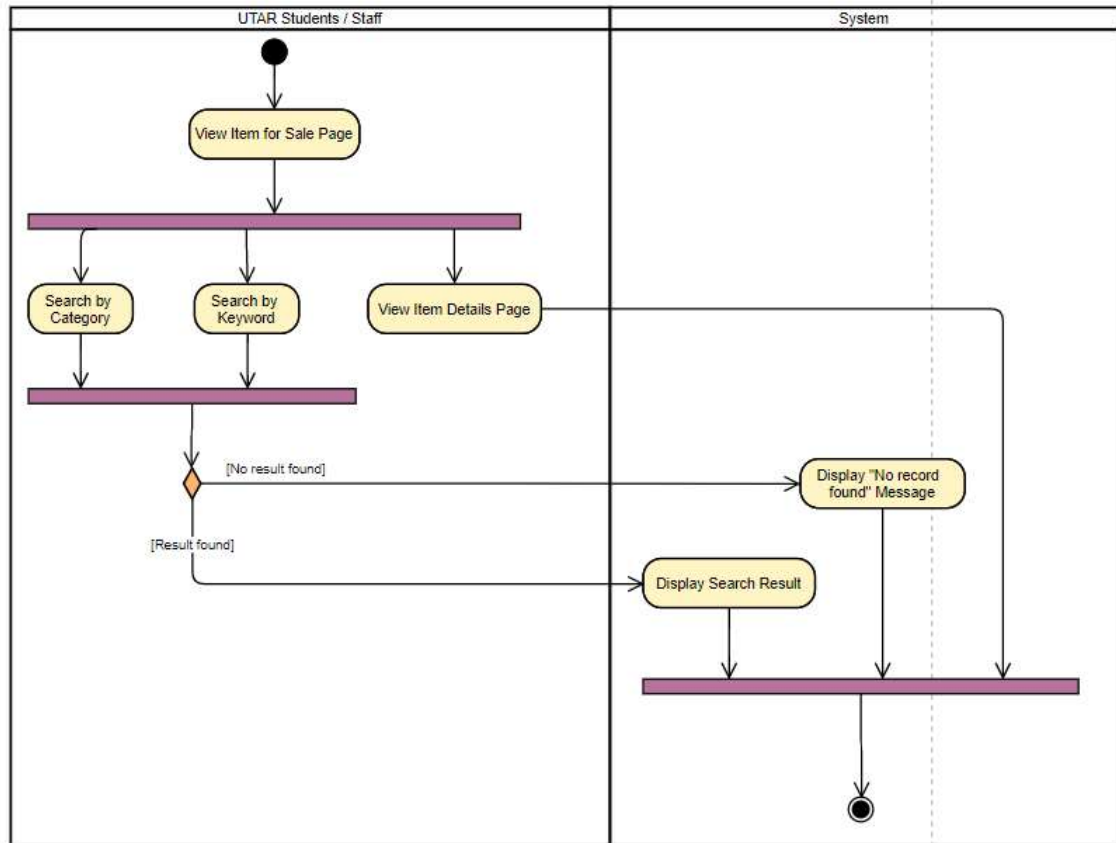


Figure 5.15: Activity Diagram : View and Search Item for Sale

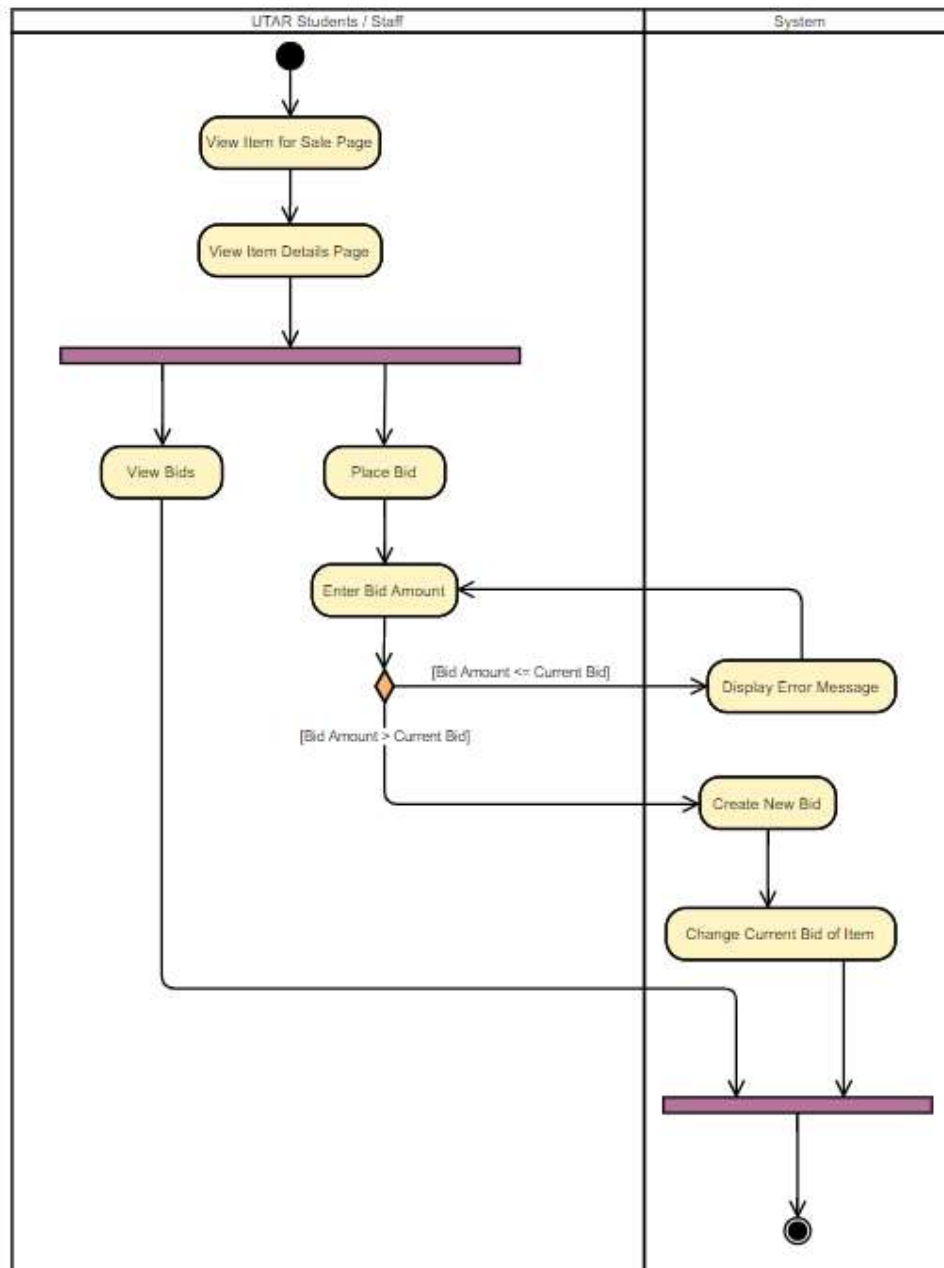


Figure 5.16: Activity Diagram : Bid Item for Sale

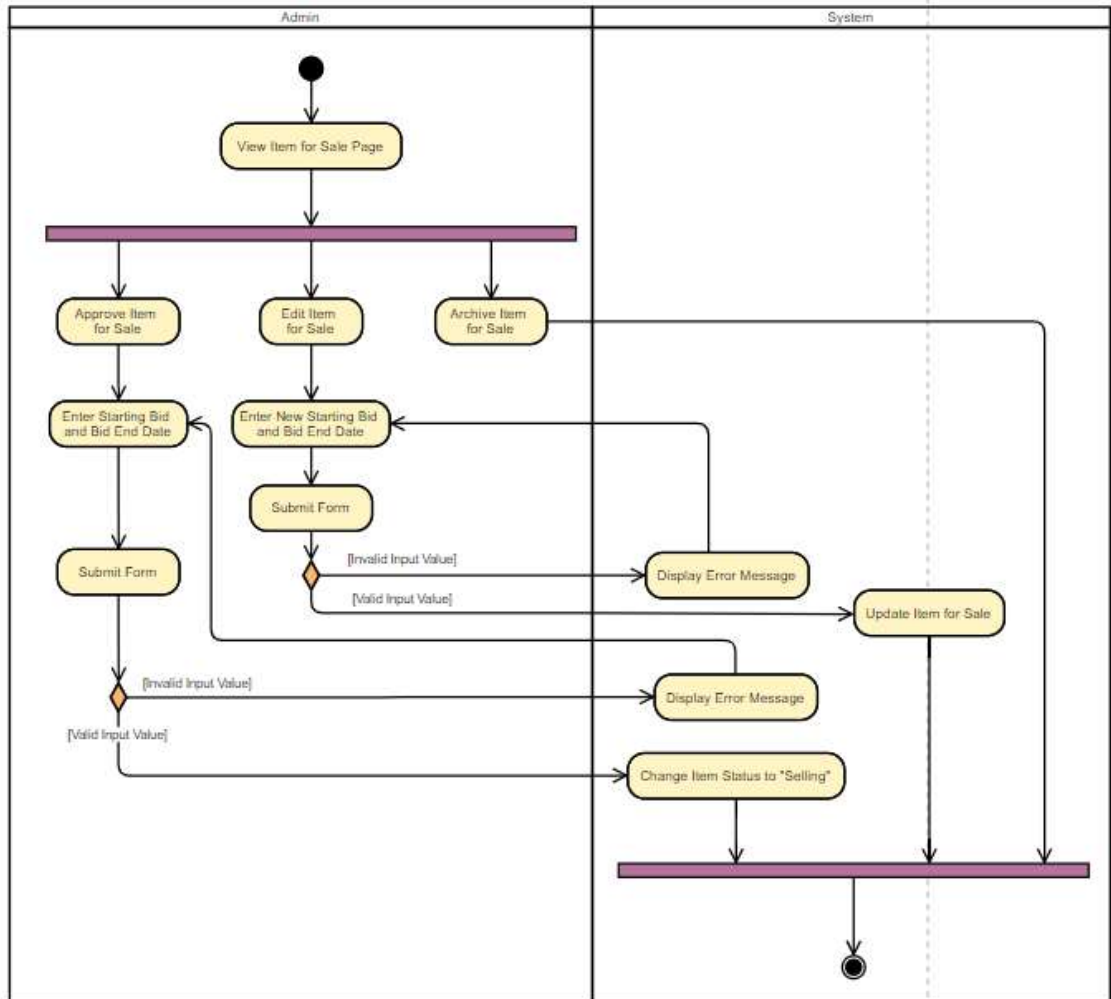


Figure 5.17: Activity Diagram : Manage Item for Sale

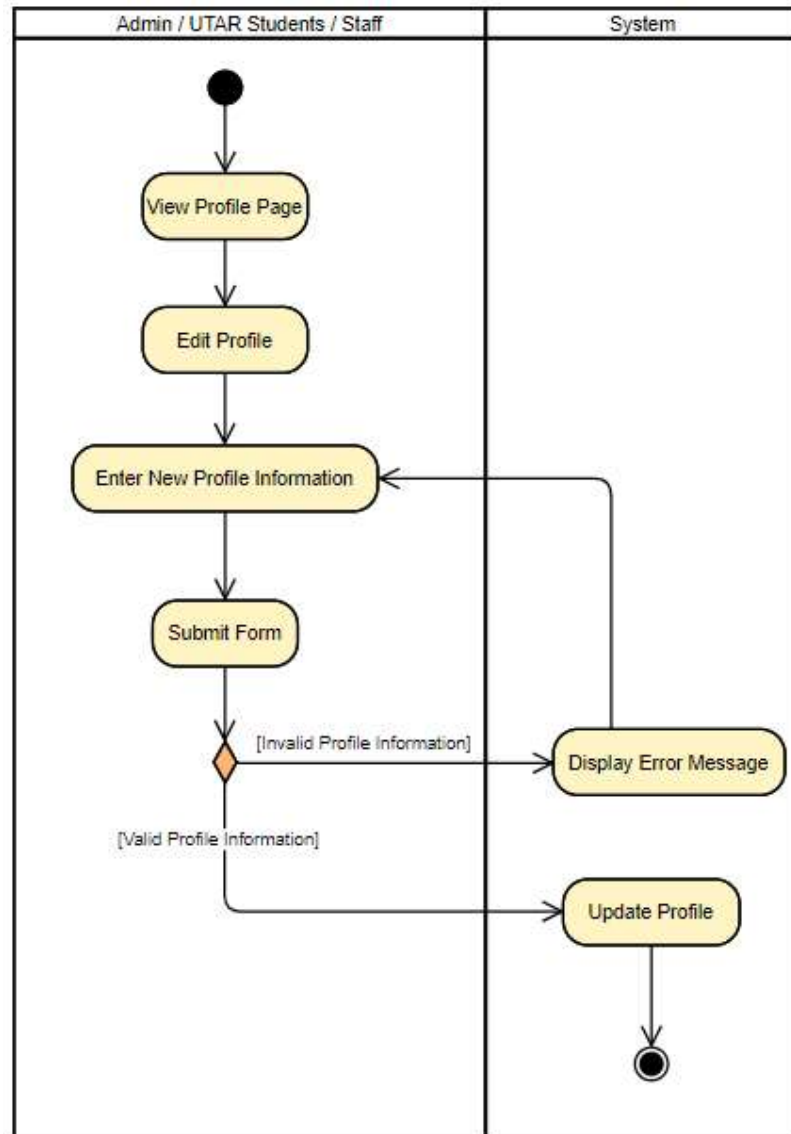


Figure 5.18: Activity Diagram : Update Profile

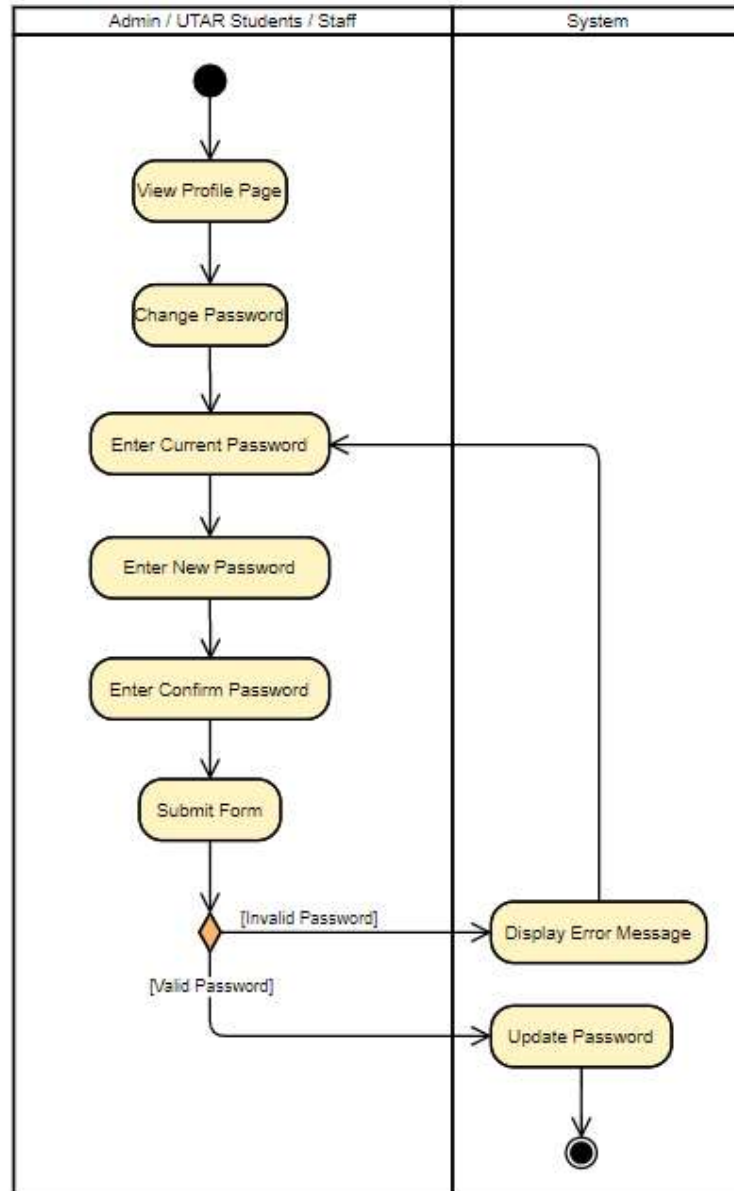


Figure 5.19: Activity Diagram : Change Password

CHAPTER 6

SYSTEM IMPLEMENTATION

6.1 Introduction

In this chapter, the route design of the system will be listed according to the database table. The role-based access control diagram is also provided to illustrate the rights of 3 different roles in this system. Furthermore, the final system user interface as well as the functionalities will also be discussed with image in the following section.

6.2 Route Design

Routes are created for each user action based on the database design. Some routes contain semicolon which represents the path parameter. The path parameter can be the item id or user selection. All routes in the system will be listed in the following section.

Table 6.1: Route Design for ‘found_items’

Table Name: found_items	
Route	Description
Method: GET	
/admin/ItemFound	Return all found items to admin
/admin/ItemFound/edit/{id}	Return found item by id on edit page
/admin/ItemFound/search-{option}={content}	Return found item by search option and content to admin
/admin/ItemFound/create	Return create found item page
/admin/ItemFound/ updateItemStatusToArchivedFromSelling/{id}	Update selling item status to ‘Archived’ by id
/admin/ItemFound/updateStatusToArchived/{id}	Update found item status to ‘Archived’ by id
/ItemFound	Return all available found item to users
/ItemFound/search-keyword={keyword}	Return available found items by keyword to users

/ItemFound/search-category={category}	Return available found items by category to users
/ItemFound/search-date={startdate}to{enddate}	Return available found items by start date and end date to users
/ItemFound/{id}	Return available found item by id to users
/admin/Dashboard/ItemFound	Return dashboard page to show the status of all found items
/admin/Dashboard/LostCase	Return dashboard page to show the status of all lost cases
/admin/Dashboard/ClaimRecord	Return dashboard page to show the status of all claim records
/admin/Dashboard/ItemSold	Return dashboard page to show the status of all selling items
Method: POST	
/admin/ItemFound/store	Create a new found item record
Method: PUT	
/admin/ItemFound/update/{id}	Update found item record by id

Table 6.2: Route Design for 'lost_items'

Table Name: lost_items	
Route	Description
Method: GET	
/admin/ItemLost	Return all lost items to admin
/admin/ItemLost/search- {option}={content}	Return lost item by search option and content to admin
/admin/ItemLost/updateStatusToArchived/{id}	Update lost item status to 'Archived' by id
/ItemLost	Return all available lost item to users
/ItemLost/edit/{id}	Return lost item by id on edit page
/ItemLost/report	Return create new lost item page

/ItemLost/search-keyword={keyword}	Return available lost items by keyword to users
/ItemLost/search-category={category}	Return available lost items by category to users
/ItemLost/search-date={startdate}to{enddate}	Return available lost items by start date and end date to users
/ItemLost/{id}	Return available lost item by id to users
/Profile/editStatusToFound/{id}	Return confirm page to update lost item status to 'Found' by
Method: POST	
/ItemLost/store	Create a new lost item record
Method: PUT	
/ItemLost/update/{id}	Update lost item record by id
/Profile/updateStatusToFound/{id}	Update lost item status to 'Found' by id

Table 6.3: Route Design for 'selling_items'

Table Name: selling_items	
Route	Description
Method: GET	
/admin/ItemForSell	Return all selling items to admin
/admin/ItemForSell/create/{id}	Return confirm page to approve expired item for sell
/admin/ItemForSell/edit/{id}	Return selling item by id on edit page
/admin/ItemForSell/updateStatusToArchived/{id}	Update selling item status to 'Archived' by id
/admin/ItemForSell/updateClosedItemStatusToArchived/{id}	Update closed selling item status to 'Archived' by id
/ItemForSell	Return all selling items to users

/ItemForSell/search-keyword={keyword}	Return selling items by keyword to users
/ItemForSell/search-category={category}	Return selling items by category to users
/ItemForSell/{id}	Return selling items by id to users
Method: POST	
/admin/ItemForSell/store/{id}	Create a new selling item record
Method: PUT	
/admin/ItemForSell/update/{id}	Update selling item record by id
/admin/ItemForSell/updateStatusToSold/{id}	Update selling item status to 'Sold' by id

Table 6.4: Route Design for 'bids'

Table Name: bids	
Route	Description
Method: GET	
/admin/ItemForSell/bid/{id}	Return all bids by selling item id to admin
/admin/ItemForSell/editStatusToSelected/{id}	Return confirm page to update selling item status to 'Selected'
Method: POST	
/ItemForSell/createBid/{id}	Create a new bid for a selling item
Method: PUT	
/admin/ItemForSell/updateStatusToSelected/{id}	Update selling item status to 'Selected' by id
/admin/ItemForSell/updateStatusToNoShow/{id}	Update selling item status to 'No Show by id

Table 6.5: Route Design for 'claims'

Table Name: claims	
Route	Description
Method: GET	
/Claim/create={founditem_id}	Return confirm page to claim the found item
/admin/Claim	Return all claim records to admin
/admin/Claim/search- {option}={content}	Return claim records by search option and content to admin
/admin/Claim/editStatusToClaimed/{id}	Return confirm page to update claim status to 'Claimed'
/admin/Claim/updateStatusToArchived/{id}	
/Profile	Return profile page with user's claim records
Method: POST	
/Claim/store={founditem_id}	Create a new claim record for a found item
Method: PUT	
/admin/Claim/updateStatusToClaimed/{id}	Update claim status to 'Claimed' by id

Table 6.6: Route Design for 'announcements'

Table Name: announcement	
Route	Description
Method: GET	
/Announcement	Return all announcements
/Announcement/search- {option}={content}	Return announcements by search option and content
/Announcement/{id}	Return announcements by id
/admin/Announcement/create	Return create new announcement page

/admin/Announcement/edit/{id}	Return announcement by id on edit page
/admin/Announcement/updateStatusToArchived/{id}	Update announcements status to 'Archived' by id
Method: POST	
/admin/Announcement/store	Create an announcement post
Method: PUT	
/admin/Announcement/update/{id}	Update announcement post by id

Table 6.7: Route Design for 'attachments'

Table Name: attachments	
Route	Description
Method: GET	
/Attachment/{id}	Return attachments by announcement id
/Attachment/delete/{id}	Delete attachments

Table 6.8: Route Design for 'settings'

Table Name: settings	
Route	Description
Method: GET	
/Setting/edit/{id}	Return setting by id on edit page
Method: PUT	
/Setting/update/{id}	Update setting by id

Table 6.9: Route Design for 'users'

Table Name: users	
Route	Description
Method: GET	
/admin/User	Return all users to admin

/admin/User/search- {option}={content}	Return users by search option and content to admin
/admin/User/create	Return create new staff account page
/Profile/edit/{id}	Return user by id on edit page
/Profile/changePassword/{id}	Return change password page by user id
Method: POST	
/admin/User/store	Create a new staff account
/Profile/updatePassword/{id}	Update user password by user id
Method: PUT	
/Profile/update/{id}	Update user by id

Table 6.10: Route Design for 'category'

Table Name: category	
Route	Description
Method: GET	
/admin/Category	Return all item categories to admin
/admin/Category/create	Return create new item category page
/admin/Category/edit/{id}	Return edit item category page by id
/admin/Category/delete/{id}	Delete item category by id
Method: POST	
/admin/Category/store	Create a new item category account
Method: PUT	
/admin/Category/update/{id}	Update item category by id

6.3 Role-Based Access Control Diagram

Role-Based Access Control was implemented in UTAR lost and found management system. It is to ensure that every user is only authorized to certain rights based on their roles. Figure 6.1 shows the rights for each role.

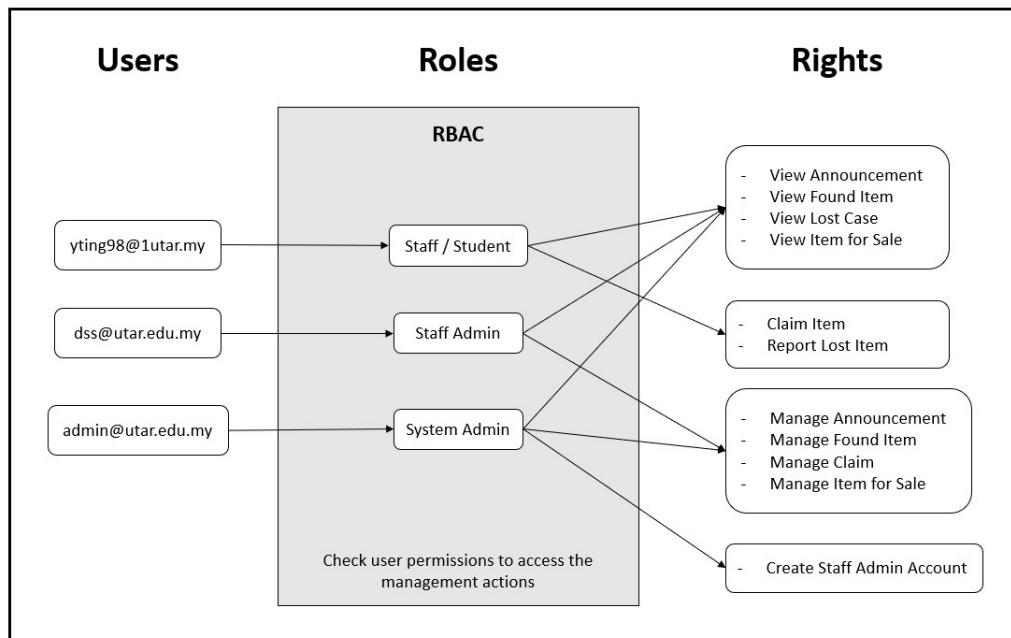


Figure 6.1: Role-Based Access Control Diagram

6.4 Results and Discussions

6.4.1 Register

To login into the system, the users are required to register a new account in this module by entering name, email, contact number, password and confirm password. Only UTAR email which ends with “@utar.edu.my” or “@1utar.my” are allowed in this system. Form validation is also applied for registration so all fields are required to enter.

After users click on the “Register” button, a verification mail will be sent to users to perform email verification. The email provides a link for users to enter the system. If the users click on the “Complete Registration” page, the user account is activated and they will be redirected to the login page of the system.

However, if users attempt to login into the system without email verification, the system will request users to check their mail to activate their account. If the users have not received a verification email or they have mistyped their email address, they can enter a new email address to resend email.

Register

Please fill out the following fields to register:

Name	<input type="text"/>
Email	<input type="text"/>
Contact No	<input type="text"/>
Password	<input type="password"/>
Confirm Password	<input type="password"/>
<input type="button" value="Register"/>	

Figure 6.2: Register page

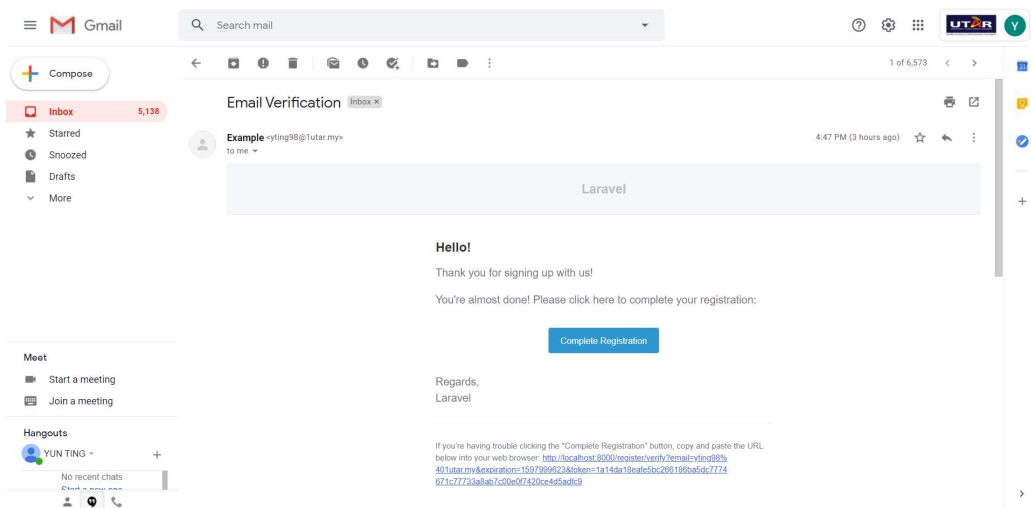


Figure 6.3: Verification mail received after registration

Email Verification

We have sent a verification mail to **yting98@tutar.my**. Please activate your account with the link in this mail. If you cannot find the mail, please also check the Junk/Spam folder!

If you have not received a verification email or if you have mistyped your email address, you can resend the verification mail.

Email

Figure 6.4: Resend email form

11:44

Register New Account

Register

Login

Figure 6.5: Register page in mobile view

6.4.2 Login

This module verifies users with database through API. The users should enter email and password to login into the system. The verification of email and password is performed when the users click on the 'Login' button. If the email does not exist in the database, or the password is incorrect, an error message 'These credentials do not match our records.' will be shown. If the email or password is empty, an error message 'Please fill out this field.' will be shown.

In this system, there are 3 user roles, which are system admin, staff admin, staff and student. Each role is authorized to certain rights. If both of the email and password is matched, the system will verify the role of users and redirect them to their home page respectively. The home page lists out various sections for users to click in to view respective information.

UTAR Lost and Found Management System Login Register

Lost and Found

Please fill out the following fields to login:

Email

Password

[Login](#) [Forgot Your Password?](#)






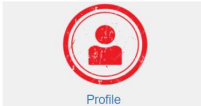
UTAR

Figure 6.6: Login page

UTAR Lost and Found Management System Chin Yun Ting Logout

Welcome Chin Yun Ting

What would you like to do?

 Announcement	 Item Found	 Lost Case
 Item for Sale	 Report Your Lost	 Profile






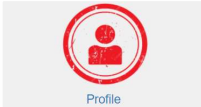
UTAR

Figure 6.7: Home page from staff and student view

UTAR Lost and Found Management System DSS Logout

Welcome DSS

What would you like to do?

 Announcement	 Item Found	 Lost Case
 Claim Record	 Item for Sale	 Profile

UTAR

Figure 6.8: Home page from staff admin view

11:45

Login

Email

Password

Login

Register

Figure 6.9: Login page from mobile view

6.4.3 Announcement

This module contains all announcements posted by admin. The system displays posted date, subject and relevant department of the announcements in table format. The search boxes are provided on the top of the table to enable users to search specific announcements based on different attributes such as posted date, subject and relevant department. If users want to search the announcements by posted date, a date picker is also provided for them to select the specific date.

Users can click on the subject to view the content of announcements. Each announcement can attach at most 5 attachments. The attachments can be pdf file or any image file. Users can also click on the attachments to view the content.

The admin can post a new announcement by entering the announcement's subject, content. Form validation is applied so the subject field and content field are required in this section. If necessary, at most 5 attachments can be attached in the

announcements. Only the person who post the announcement can edit the content of that particular announcement. Furthermore, the admin can archive the announcements.

UTAR Lost and Found Management System DSS Logout

Home / Announcement

Announcement

[+ Post New Announcement](#)

No	Date	Subject	Department	
	<input type="text" value="mm/dd/yyyy"/>	<input type="text"/>	<input type="text"/>	
1	08/17/2020	Movement Control Order: For Students Cards Renewal Cases	Department of Safety & Security (Sungai Long Campus)	✓ ✗
2	08/17/2020	Lost & Found Management System	Department of Safety & Security (Sungai Long Campus)	✓ ✗

[Back](#)

Figure 6.10: Announcement Page from admin view

UTAR Lost and Found Management System DSS Logout

Home / Announcements / Announcement Details

Announcement Details

Re: Lost & Found Management System

Dear Students,

We are responsible to:

1. Handle and receive reports on lost and found items
2. Handle disposal of lost and found items
3. Handle sales of unclaimed items

Thank you.

Best Regards,
 Department of Safety & Security (Sungai Long Campus)
 Universiti Tunku Abdul Rahman

[Back](#)

Figure 6.11: Announcement Details Page

UTAR Lost and Found Management System DSS Logout

Home / Announcements / Post New Announcement

Post New Announcement

Subject

Content

Attachments (Optional)

No file chosen

No file chosen

No file chosen

No file chosen

No file chosen

Figure 6.12: Post new announcement page from admin view

Announcement

Movement Control Order: For Students Cards Renewal Cases

Posted on 17 Aug 2020
By Department of Safety & Security (Sungai Long Campus)

Lost & Found Management System

Posted on 17 Aug 2020
By Department of Safety & Security (Sungai Long Campus)

Announcement Details

Re: Movement Control Order: For Students Cards Renewal Cases

Posted on 17 Aug 2020
By Department of Safety & Security (Sungai Long Campus)

Dear Students,

To address, the issue of student cards which have either expired / lost / stolen during the Malaysian MCO period, and due to the various constraints on facilitating the physical card, SODEMC-MDU will issue the e-copy of the MCO student card (as per attachment below)

Please take note that this MCO student card is only valid during the period of the Malaysian MCO.

In response to each of the questions raised by students and to further elaborate on the e-copy of the MCO student card, please take note of the following:

Students who do require the physical e-card are required to email to the person in-charge together with the following information listed below:

- 1) Name as per IC/ Passport
- 2) Student ID number
- 3) IC/ Passport number
- 4) Programme Study
- 5) Reason for requesting the MCO Student ID

Best Regards,
Department of Safety & Security (Sungai Long Campus)
Universiti Tunku Abdul Rahman

Home
 Lost
 Announcement
 Sell
 Profile

Home
 Lost
 Announcement
 Sell
 Profile

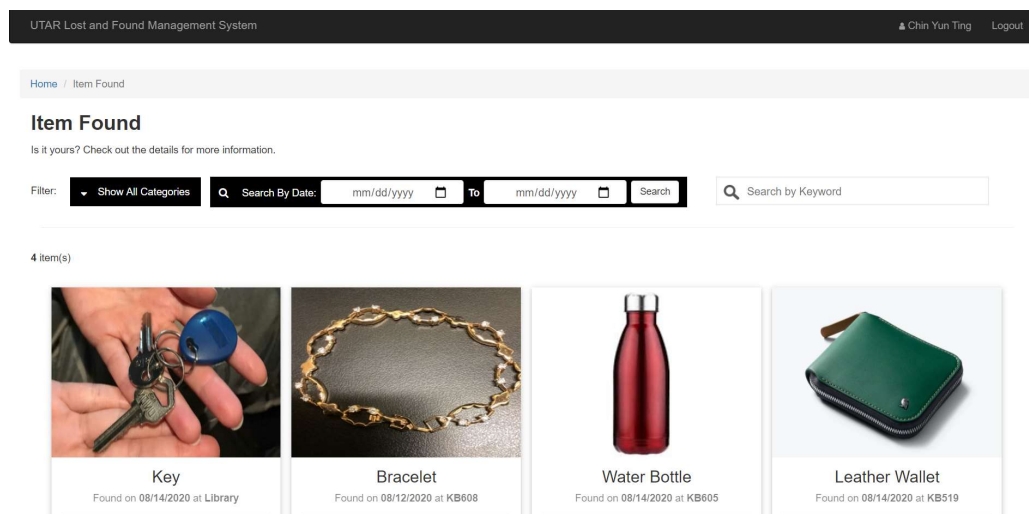
Figure 6.13: Announcement page from mobile view

6.4.4 Found Item

In this module, all items are displayed in card format with item image, item name and the date and location found from staff and student view. Search function is provided for staff and students in this page. Staff and students can search the item by item category, date found and keyword. If no item matched the selected category, date range or keyword, the system will display “No record found”. Staff and students can click on the “Details” to view the detailed information of item such as item name, item category, item description, date found, location found and current status with a ‘Claim’ button.

From admin view, all items are displayed in table format for better searches. The search boxes are provided on the top of the table to enable admin to search specific item based on different attributes. If they want to search the item by date found, a date picker is also provided for them to select the specific date.

Furthermore, the admin can update new item by entering the item’s name, category, description, date and location found, image, item holder name and location to claim back the item. Form validation is applied so all fields are required to enter. Only the person who update the item can edit the information of that particular item. The admin can also archive the items.



UTAR Lost and Found Management System Chin Yun Ting Logout

Home / Item Found

Item Found

Is it yours? Check out the details for more information.

Filter: Show All Categories Search By Date: mm/dd/yyyy To mm/dd/yyyy Search Search by Keyword

4 item(s)

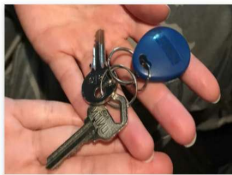




 Key Found on 08/14/2020 at Library	 Bracelet Found on 08/12/2020 at KB608	 Water Bottle Found on 08/14/2020 at KB605	 Leather Wallet Found on 08/14/2020 at KB519
--	---	--	---

Figure 6.14: Item Found page from staff and student view

UTAR Lost and Found Management System Chin Yun Ting Logout

Home / Item Found / Item Details



Item Details

Item Name	Leather Wallet
Item Category	Wallet
Item Description	Green leather wallet
Date Found	08/14/2020
Location Found	KB519
Status	Available

[Claim](#)




Figure 6.15: Item Details page from staff and student view

UTAR Lost and Found Management System DSS Logout

Home / Item Found

Item Found

[+ Add New Item](#)




No	Item ID	Name	Image	Category	Description	Location Found	Date Found	Who hold this item?	Where to find?	Status	
	<input type="text"/>	<input type="text"/>		<input type="text" value="v"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="mm/dd/yyyy"/> <input type="text" value="📅"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="v"/>	
1	F1003	Jacket		Clothing	Adidas female jacket	KB520	08/13/2020	Lee Mei Hao	Department of Safety & Security	Sold at 2020-08-19 13:16:51	<input checked="" type="checkbox"/> <input type="checkbox"/>
2	F1004	Slipper		Others	Blue slipper	KB100	08/11/2020	Lee Mei Hao	Department of Safety & Security	Selling	<input type="checkbox"/> <input checked="" type="checkbox"/>
3	F1007	Laptop Charger		Computers & Electronic	Acer laptop charger	KB101	08/14/2020	Lee Mei Hao	Department of Safety & Security	Sold at 2020-08-17 16:48:29	<input checked="" type="checkbox"/> <input type="checkbox"/>

Figure 6.16: Item Found page from admin view

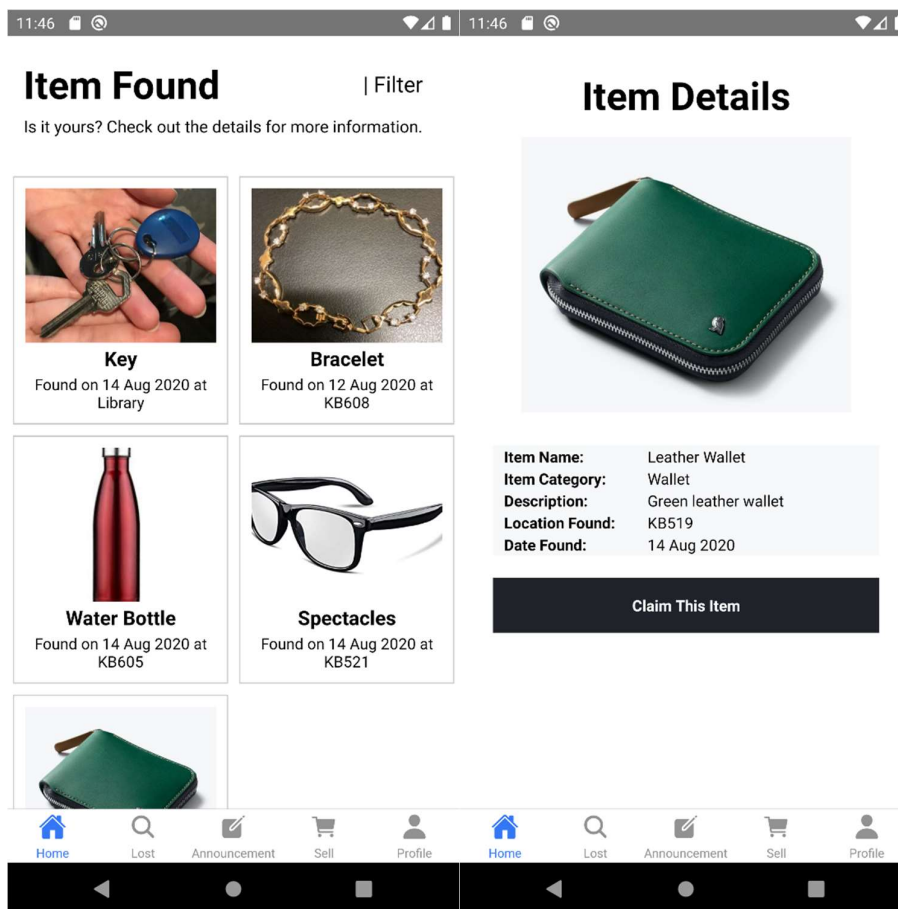


Figure 6.17: Item Found page from mobile view

6.4.5 Claim Item

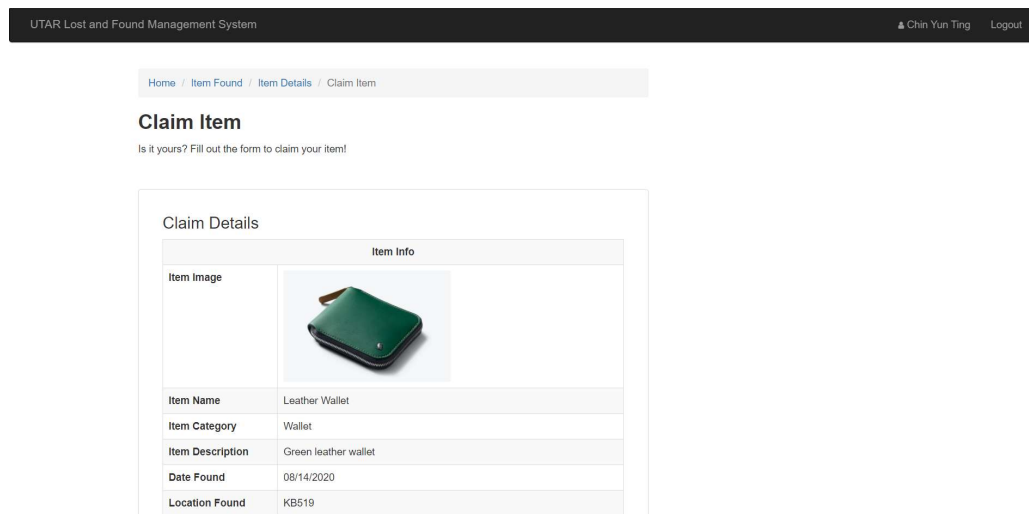
The staff and students can click on the 'Claim' button in the item details page to claim the item. The claim page displays the item details and also their personal information for them to check before claim. If the staff and students confirm to claim this item, they require to select a claim date. Form validation is applied in this page so staff and students are not allowed to select the date before today.

When the staff and students click the 'Submit' button, the status of the item is changed to 'Pending'. The item is not displayed in the item found page anymore as it is reserved for the staff and students to claim back their item. From the admin view, there is a new claim record.

All claim records are displayed in table format for better searches. The search boxes are provided on the top of the table to enable admin to search specific claim record based on different attributes. If they want to search the item by claim date, a

date picker is also provided for them to select the specific date. The admin can also archive the claim records.

If the item owner claim back their item within the claim date, the staff admin can click on the 'Claimed' button to mark the claim status as 'Claimed'. However, if the person who submit the claim form does not claim back the item within the claim date, the system will mark the claim status as 'No Show'.



UTAR Lost and Found Management System Chin Yun Ting Logout

Home / Item Found / Item Details / Claim Item

Claim Item

Is it yours? Fill out the form to claim your item!

Claim Details


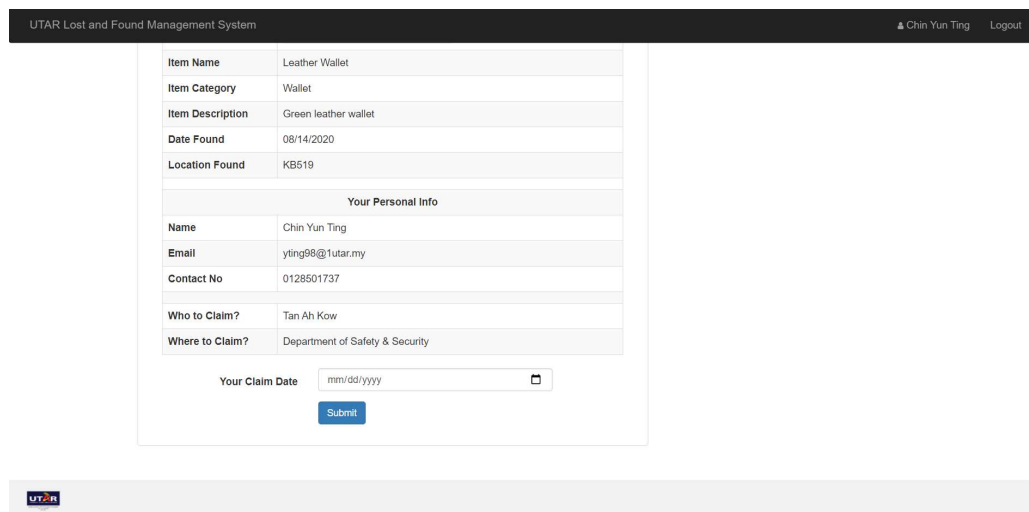
Item Info	
Item Image	
Item Name	Leather Wallet
Item Category	Wallet
Item Description	Green leather wallet
Date Found	08/14/2020
Location Found	KB519

Figure 6.18: Claim Item page from staff and student view



UTAR Lost and Found Management System Chin Yun Ting Logout

Item Name	Leather Wallet
Item Category	Wallet
Item Description	Green leather wallet
Date Found	08/14/2020
Location Found	KB519
Your Personal Info	
Name	Chin Yun Ting
Email	yting98@tutar.my
Contact No	0128501737
Who to Claim?	Tan Ah Kow
Where to Claim?	Department of Safety & Security
Your Claim Date	<input type="text" value="mm/dd/yyyy"/> <input type="button" value="📅"/>
<input type="button" value="Submit"/>	




Figure 6.19: Claim Item page from staff and student view

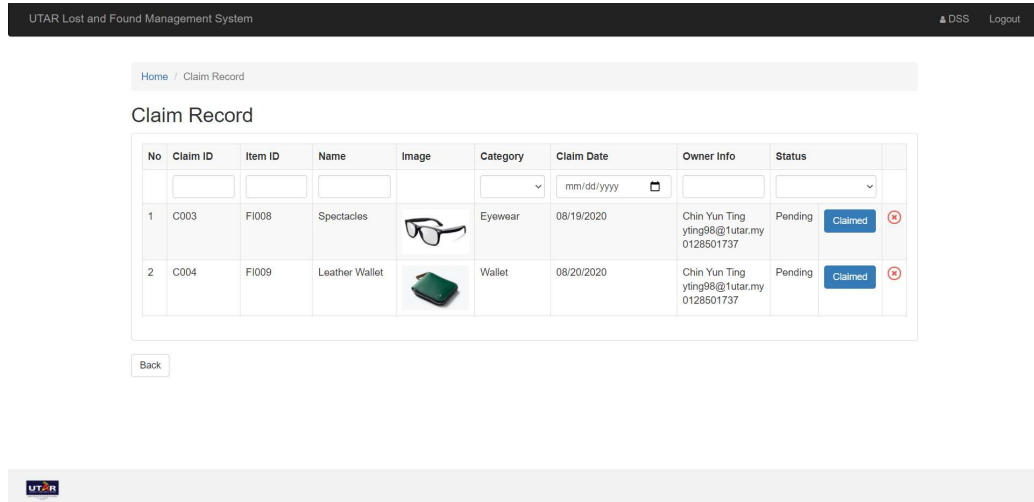


Figure 6.20: Claim Record page from staff admin view

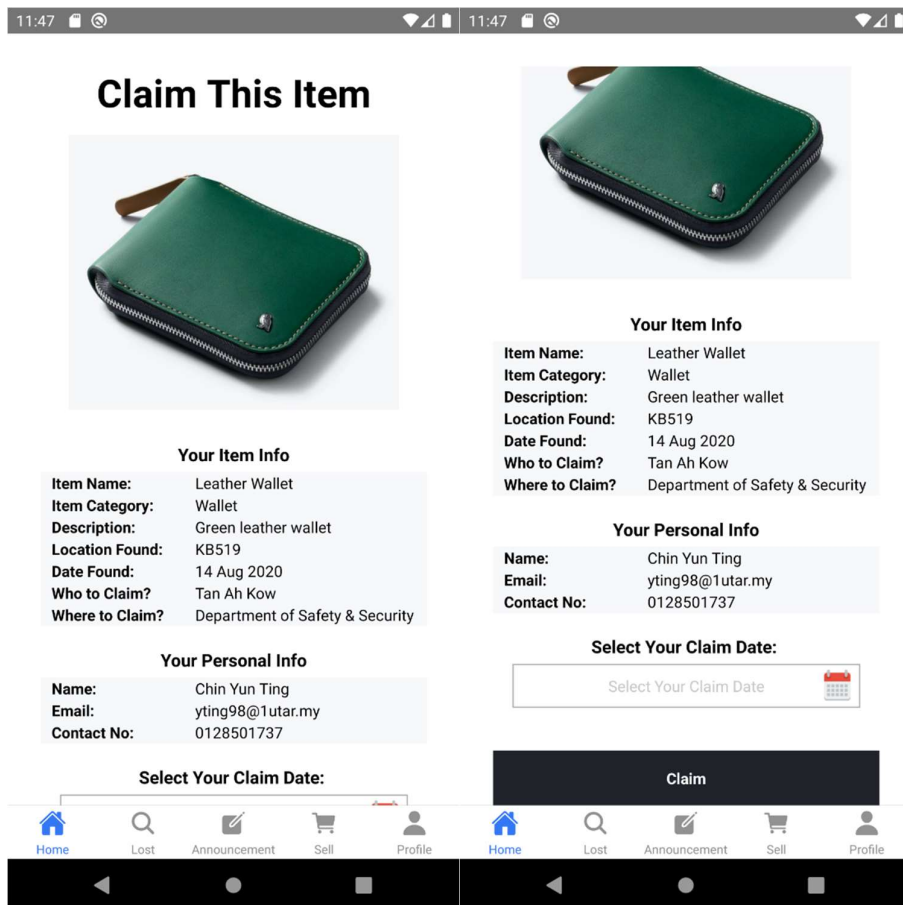


Figure 6.21: Claim Item page from mobile view

6.4.6 Lost Case

In this module, all items are displayed in card format with item image, item name, date lost and possible location from staff and student view. Search function is provided for staff and students in this page. Staff and students can search the item by item category, date lost and keyword. If no item matched the selected category, date range or keyword, the system will display “No record found”. Staff and students can click on the “Details” to view the detailed information of item such as item name, item category, item description, date lost, possible location, current status and the contact information of owner.

If the staff and students lost their item, they can report their item in the report lost page by entering the item name, category, description, possible location, date lost and item image. Form validation is applied so all fields are required to enter. Only the person who report the item can edit the information of that particular item.

From admin view, all items are displayed in table format for better searches. The search boxes are provided on the top of the table to enable admin to search specific item based on different attributes. If they want to search the item by date lost, a date picker is also provided for them to select the specific date. The admin can also archive the record of lost case from the system.

UTAR Lost and Found Management System Chin Yun Ting Logout

Home / Lost Case

Lost Case

If you found these items, please contact the owners to return back their items. Thank you.

Filter: Show All Categories Search By Date: mm/dd/yyyy To mm/dd/yyyy Search Search by Keyword

2 item(s)



 <p>Water Bottle Lost on 08/15/2020 at KB300</p>	 <p>Key Lost on 08/14/2020 at Library</p>
--	---

Figure 6.22: Lost Case page from staff and student view

UTAR Lost and Found Management System Chin Yun Ting Logout

Home / Report Lost

Report Lost

Lost something and can't find it in the items list? Fill out the form to report your item!

Name

Category

Description

Possible Location

Date Lost



Image

Figure 6.23: Report Lost page from staff and student view

UTAR Lost and Found Management System DSS Logout

Home / Lost Case

Lost Case

No	Item ID	Name	Image	Category	Description	Possible Location	Date Lost	Owner Info	Status	
	<input type="text"/>	<input type="text"/>		<input type="text" value="Select Category"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="mm."/> <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
1	LI001	Water Bottle		Others	Puma water bottle	KB300	08/15/2020	Chin Yun Ting yting98@utar.my 0128501737	Waiting to be found	<input type="button" value="⊘"/>
2	LI002	Key		Keys	Silver key with Cypress card	Library	08/14/2020	Chong Zhi Xiang xiang0424@utar.my 0143929543	Waiting to be found	<input type="button" value="⊘"/>




Figure 6.24: Lost Case page from admin view

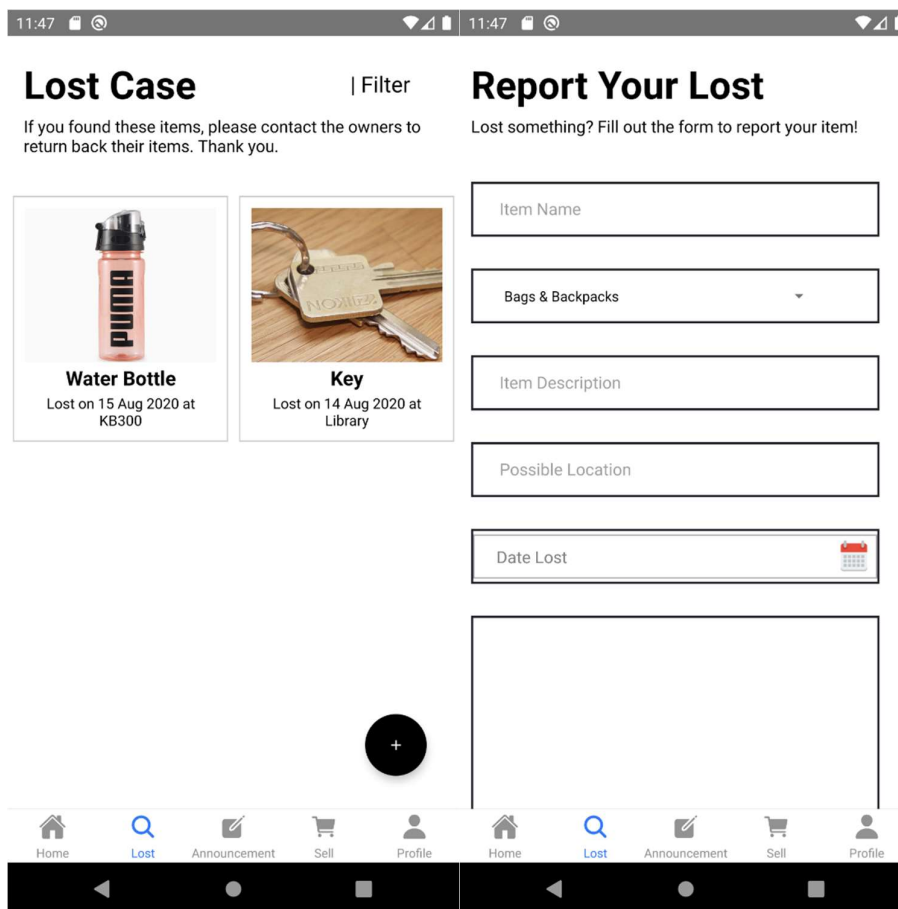


Figure 6.25: Lost Case page from mobile view

6.4.7 Item for Sale

The staff admin can set the expired duration for their updated items in the system. The default expired duration is 30 days. It means that if the updated item is still available without any staff or student's claim after 30 days, the system will mark the item status as "Expired". All expired item will be pending for the staff admin to approve for sell as auction format in this system. The staff admin is required to enter the starting price and the end date of auction.

From staff and students view, all items are displayed in card format with item image and current price. Search function is provided for staff and students in this page. Staff and students can search the item by item category and keyword. If no item matched the selected category or keyword, the system will display "No record found". Staff and students can click on the "Details" to view the detailed information of item such as item name, item category, item description, starting price, current price and

auction end date. Staff and students can also view all bids for the particular item. Staff and students can place their bids which are more than the current bid.

After the staff and students click on the “Bid” button, a confirmation box will pop out to inform staff and students about the difference between their bid amount and the current price. The bid is confirmed after they click on the “OK” button. The item is available for staff and students to place their bid until the bid end date. The system will close the auction and the staff admin can select final winner of the auction.

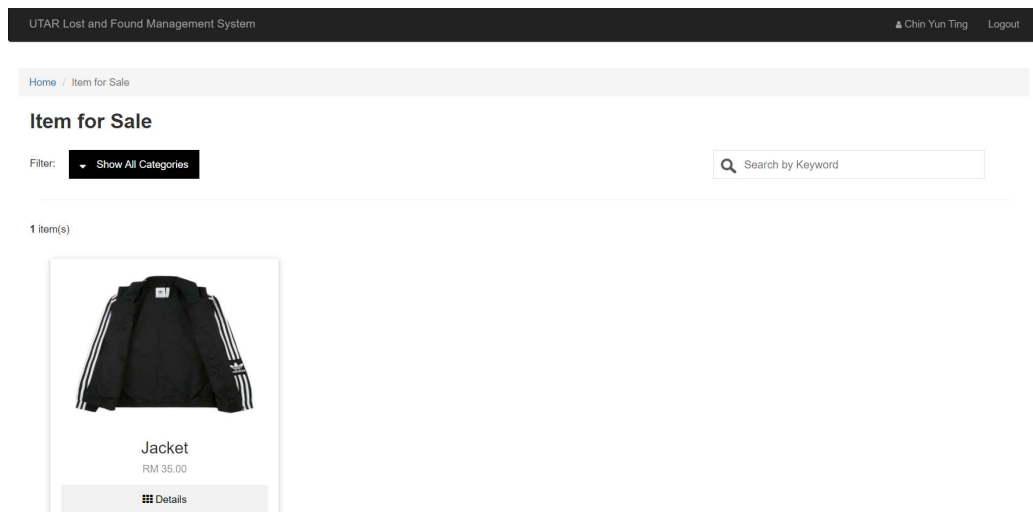


Figure 6.26: Item for Sale page from staff and student view

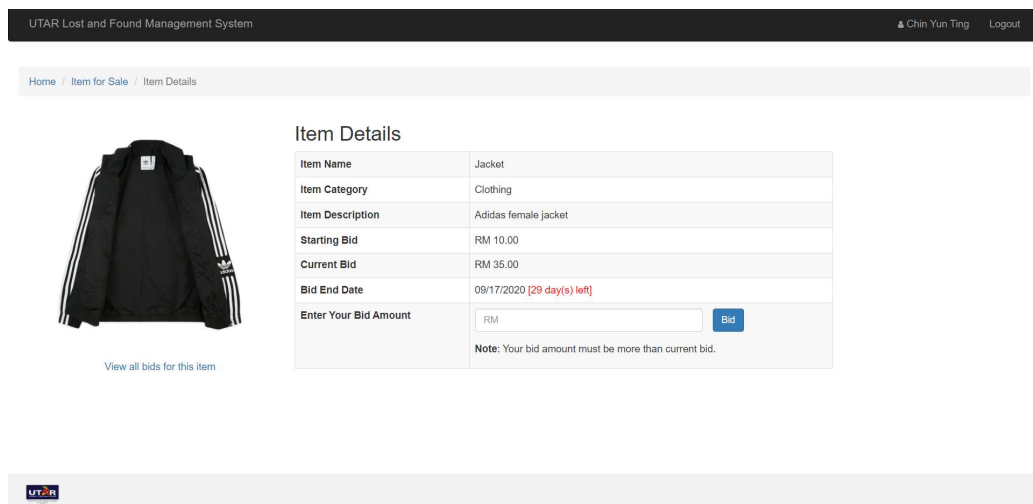




Figure 6.27: Item Details page from staff and student view

Home / Item for Sale

Item for Sale

Ready to Sell									
No	Item ID	Name	Image	Who hold this item?	Where to find?	Status			
1	FI004	Slipper		Lee Mei Hao	Department of Safety & Security	Expired	Approve for Sell		

On Selling									
No	Item ID	Name	Image	Who hold this item?	Where to find?	Starting Bid	Current Bid	Bid End Date	Status
1	FI003	Jacket		Lee Mei Hao	Department of Safety & Security	RM 10.00	RM 35.00	09/17/2020	Selling



History									
No	Item ID	Name	Image	Who hold this item?	Where to find?	Starting Bid	Current Bid	Bid End Date	Status
1	FI007	Laptop		Lee Mei Hao	Department of Safety & Security	RM 5.00	RM 15.00	09/16/2020	Sold at 2020-08-17

Figure 6.28: Item for Sale page from staff admin view

11:49
11:49


Item for Sale



Jacket
RM35.00

| Filter

Bid This Item



[View all bids for this item](#)

Item Name: Jacket
Item Category: Clothing
Description: Adidas female jacket
Starting Bid RM10.00
Current Bid: RM35.00
Bid End Date: 17 Sep 2020

Enter Your Bid Amount:

RM

Bid

Home
Lost
Announcement
Sell
Profile
Home
Lost
Announcement
Sell
Profile

Figure 6.29: Item for Sale page from mobile view

6.4.8 Profile

This module shows user's personal details such as name, email and contact number. Users can click on the edit icon to update their personal information. They can also click on the "Change Password" button to change their account password by entering the current password, new password and confirm password.

Furthermore, from staff and student view, the profile module also shows their claim cases, lost cases as well as the successful bid. It allows the staff and students to check the current status of their records within a page. For the lost case, if the staff and students found their lost items, they can click on the "Found" button to inform the system. When the status of lost case is marked as found, the item will not be displayed in the lost case page anymore.

From staff admin view, there is a settings section for staff admin to edit the expired duration of items. By doing so, all the items updated in the system will be expired based on this expired duration.

UTAR Lost and Found Management System Chin Yun Ting Logout

Home / Profile

Profile

Personal Details ✔

Name	Chin Yun Ting
Email	yting98@utar.my
Contact No	0128501737

[Change Password](#)

Your Claim Case

No	Item Name	Who / Where to Claim?	Claim Date	Status
1	Key	Amy Bong Library main counter	08/16/2020	No show
2	Spectacles	Tan Ah Kow Department of Safety & Security	08/19/2020	No show

Your Lost Case

No	Item Name	Category	Date & Location	Status
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Figure 6.30: Profile page from staff and student view

UTAR Lost and Found Management System Chin Yun Ting Logout


Your Claim Case

No	Item Name	Who / Where to Claim?	Claim Date	Status
1	Key	Amy Bong Library main counter	08/16/2020	No show
2	Spectacles	Tan Ah Kow Department of Safety & Security	08/19/2020	No show

Your Lost Case

No	Item Name	Category	Date & Location	Status
1	Water Bottle	Others	Lost on 08/15/2020 at KB300	Waiting to be found Found

Your Successful Bid

No	Item Image	Item Name	Bid Amount	Date & Time	Status
1		Laptop Charger	RM 15.00	2020-08-17 16:47:33	Selected

[Back](#)

Figure 6.31: Profile page from staff and student view

UTAR Lost and Found Management System DSS Logout

[Home](#) / [Profile](#)

Profile

Personal Details ✔

Name	DSS Staff
Department	Department of Safety & Security (Sungai Long Campus)
Email	dss@utar.edu.my
Contact No	0123456789

[Change Password](#)

Settings

Expired Duration	60 days ✔
------------------	--

[Back](#)

Figure 6.32: Profile page from staff admin view

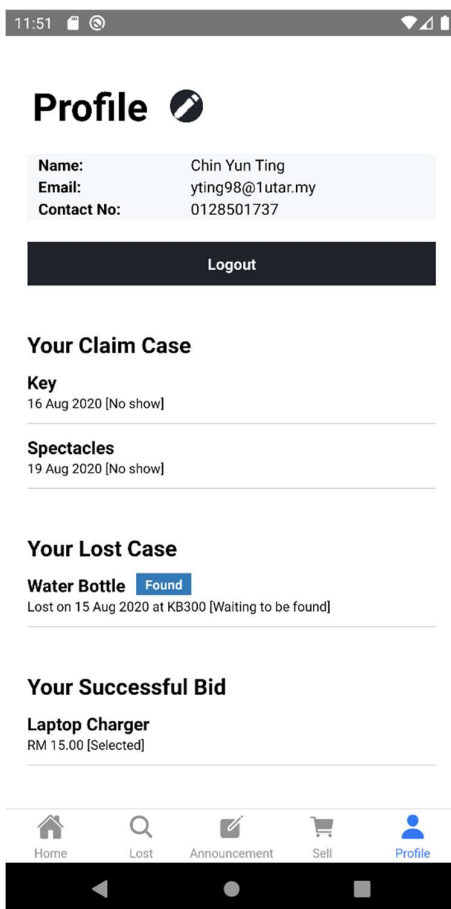


Figure 6.33: Profile page from mobile view

6.4.9 Staff Account

In this module, the system admin can a new staff admin account for each department. The system shows all staff admin accounts in table format. The search boxes are provided on the top of the table to enable system admin to search for specific staff admin account based on different attributes such as department, abbreviation, email and contact number. The system admin can click on the “Create New Staff Account” to create a new staff admin account by entering department, name, email and contact number. Form validation is applied in this page so all fields are required. The system admin can also edit any staff admin account information from the list.

UTAR Lost and Found Management System Administrator Logout

Home / Staff Account

Staff Account

[Create New Staff Account](#)

No	Department	Abbreviation	Email	Contact No	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
1	Mary KUOK Pick Hoo Library	Library	library@utar.edu.my	0123456789	✓
2	Department of Safety & Security (Sungai Long Campus)	DSS	dss@utar.edu.my	0123456789	✓
3	Department of Laboratory Management and Safety Administration	LKC FES-DLMSA	dlmsa@utar.edu.my	0123456789	✓

[Back](#)

Figure 6.34: Staff Admin Account page from system admin view

UTAR Lost and Found Management System Administrator Logout

Home / Staff Account / Create New Staff Account

Create New Staff Account

Department

Name

Email

Contact No

[Submit](#)

[Back](#)

Figure 6.35: Create New Staff Admin account page from system admin view

6.4.10 Item Category

















In this module, the system admin can customize the item categories in the system. All item categories are displayed in alphabetical order. The system admin can click on the “Add New Item Category” button to add a new item category. Furthermore, the system admin can also edit or delete the current item category.

UTAR Lost and Found Management System Administrator Logout

Home / Item Category

Item Category

[+ Add New Item Category](#)

No	Category	
1	Bags & Backpacks	 
2	Clothing	 
3	Computers & Electronic	 
4	Eyewear	 
5	Keys	 
6	Mobile Devices	 
7	Others	 
8	Wallet	 

[Back](#)

Figure 6.36: Item Category page from system admin view

UTAR Lost and Found Management System Administrator Logout

Home / Item Category / Add New Item Category

Add New Item Category

Please Enter New Item Category:

[Submit](#)

[Back](#)

UTAR

Figure 6.37: Add New Item Category page from system admin view

CHAPTER 7

SYSTEM TESTING

7.1 Introduction

In this chapter, unit testing, integration testing and user acceptance testing were conducted to evaluate the system. The test case result will be listed in the following section.

7.2 Unit Testing

Table 7.1: Unit Test Case – Test Register New Account

Test Case ID:	TC001	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Register Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test Register New Account	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to enter the system						
User is required to click the “Register” button from the navigation bar						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
Register with valid name, email, contact no, password and confirm password	1. Enter valid name	“Chin Yun Ting”	New account is registered . A verification mail is sent to user	User is redirected to login page	New account is registered . A verification mail is sent to user	PASS
	2. Enter valid email	“yting98@lutar.my”				
	3. Enter valid contact no	“012235971”				
	4. Enter valid password	“123456”				
	5. Enter valid confirm password	“123456”				

	6. Click “Register” button					
Register with valid name, contact no, password and confirm password but invalid email	1. Enter valid name	“Chin Yun Ting”	Error message “The email should be UTAR mail” is shown		Error message “The email should be UTAR mail” is shown	PASS
	2. Enter invalid email	“yting98@gmail.com”				
	3. Enter valid contact no	“012235971”				
	4. Enter valid password	“123456”				
	5. Enter valid confirm password	“123456”				
	6. Click “Register” button					
Register with empty value	1. Enter valid name	“”	Error message “Please fill out this field” is shown		Error message “Please fill out this field” is shown	PASS
	2. Enter valid email	“”				
	3. Enter valid contact no	“”				
	4. Enter valid password	“”				
	5. Enter valid confirm password	“”				
	6. Click “Register” button					

Table 7.2: Unit Test Case – Test Login Verification

Test Case ID:	TC002	Test Designed by:	Chin Yun Ting
Test Priority:	High	Test Designed date:	21 st August 2020
Module Name:	Login Module	Test Executed by:	Chin Yun Ting
Test Title:	Test Login Verification	Test Execution date:	24 th August 2020
Pre-condition: User is required to click the link in the verification mail to verify account			

Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
Login with valid email and valid password	1. Enter valid email	“yting98@lutar.my”	Successfully login	User is redirected to homepage	Successfully login	PASS
	2. Enter valid password	“123456”				
	3. Click “Login” button					
Login with valid email and invalid password	1. Enter valid email	“yting98@lutar.my”	Error message “These credentials do not match our records” is shown		Error message “These credentials do not match our records” is shown	PASS
	2. Enter invalid password	“123456789”				
	3. Click “Login” button					
Login with invalid email and valid password	1. Enter invalid email	“yting@lutar.my”	Error message “These credentials do not match our records” is shown		Error message “These credentials do not match our records” is shown	PASS
	2. Enter valid password	“123456”				
	3. Click “Login” button					
Login with invalid email and invalid password	1. Enter invalid email	“yting@lutar.my”	Error message “These credentials do not match our records” is shown		Error message “These credentials do not match our records” is shown	PASS
	2. Enter invalid password	“123456789”				
	3. Click “Login” button					

Table 7.3: Unit Test Case – Test View and Search Announcement

Test Case ID:	TC003	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Announcement Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test View and Search Announcement	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system						
User is required to select the “Announcement” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
View announcement details	1. Click the subject of announcement		Announcement subject, content and attachments are shown	User is redirected to announcement details page	Announcement subject, content and attachments are shown	PASS
View attachments	1. Click the subject of announcement		The content of attachment is shown	User is redirected to attachment page	The content of attachment is shown	PASS
	2. Click the attachment link					
Search announcements by date	1. Click the calendar icon in the search box		All announcements which are posted on 08/17/2020 are shown		All announcements which are posted on 08/17/2020 are shown	PASS
	2. Select date from datepicker	08/17/2020				

Search announcement by date which is not match with all records	1. Click the calendar icon in the search box		Message “No record found” is shown		Message “No record found” is shown	PASS
	2. Select date from datepicker	01/01 /2020				
Search announcements by valid subject	1. Enter subject in subject search box	“Students cards”	All announcements which contains “Student cards” in the subject are shown		All announcements which contains “Student cards” in the subject are shown	PASS
Search announcement by subject which is not match with all records	1. Enter subject which is not match with all records in subject search box	“auction funds”	Message “No record found” is shown		Message “No record found” is shown	PASS
Search announcement by subject with empty value	1. Enter empty value in subject search box	“”	No change in number of announcements		No change in number of announcements	PASS
Search announcements by valid department	1. Enter department in department search box	“Safety”	All announcements which contains “Safety” in the		All announcements which contains “Safety” in the	PASS

			department are shown		department are shown	
Search announcement by department which is not match with all records	1. Enter department which is not match with all records in department search box	“Engineeri ng”	Message “No record found” is shown		Message “No record found” is shown	PASS
Search announcements by department with empty value	1. Enter empty value in department search box	“”	No change in number of announcements		No change in number of announcements	PASS

Table 7.4: Unit Test Case – Test Create, Edit and Archive Announcement

Test Case ID:	TC004	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Announcement Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test Create, Edit and Archive Announcement	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system as admin						
User is required to select the “Announcement” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
Post new announcement with all valid field	1. Click “Post New Announcement”		New announcement is posted	User is redirected to announcement page	New announcement is posted	PASS
	2. Enter valid subject and content	Valid subject and				

		content				
	3. Upload attachment file					
Post new announcement with empty value	1. Click “Post New Announcement”		Both error message “The subject field is required” and “The content field is required” are shown		Both error message “The subject field is required” and “The content field is required” are shown	PASS
	2. Enter empty subject and content	“”				
Edit announcement subject	1. Click edit icon		The selected announcement subject is changed	User is redirected to announcement page	The selected announcement subject is changed	PASS
	2. Change announcement subject	Valid subject				
Edit announcement content	1. Click edit icon		The selected announcement content is changed	User is redirected to announcement page	The selected announcement content is changed	PASS
	2. Change announcement content	Valid content				
Update attachments in attachment	1. Click edit icon		The selected announcement attachment is updated	User is redirected to announcement page	The selected announcement attachment is updated	PASS
	2. Delete previous attachment					
	3. Upload new attachment					
Archive announcement	1. Click archive icon		The selected announcement		The selected announcement	PASS

ment with confirm	2. Click “OK” for confirmation box		nt is archived		nt is archived	
Archive announce ment without confirm	1. Click archive icon		No announceme nt is archived		No announceme nt is archived	PASS
	2. Click “Cancel” for confirmation box		nt is archived		nt is archived	

Table 7.5: Unit Test Case – Test View and Search Item Found

Test Case ID:	TC005	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Item Found Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test View and Search Item Found	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system						
User is required to select the “Item Found” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
View item found details	1. Click “Details” button of item		Item image, item name, item category, item description, date and location found are shown	User is redirected to item details page	Item image, item name, item category, item description, date and location found are shown	PASS
Search item found by category	1. Click “Show All Categories” button		All items under “Keys”		All items under “Keys”	PASS

	2. Select item category	“Keys”	category are shown		category are shown	
Search item found by category which is not match with all records	3. Click “Show All Categories” button		Message “No record found” is shown		Message “No record found” is shown	PASS
	4. Select item category	“Bags & Backpacks”				
Search item found by date range	1. Click first calendar icon and select date from date picker	08/10/2020	All items found within 08/10/2020		All items found within 08/10/2020	PASS
	2. Click second calendar icon and select date from date picker	08/13/2020	and 18/13/2020 are shown		and 18/13/2020 are shown	
	3. Click “Search” button					
Search item found by date range which is not match with all records	1. Click first calendar icon and select date from date picker	12/01/2020	Message “No record found” is shown		Message “No record found” is shown	PASS
	2. Click second calendar icon and select date from date picker	12/31/2020				
	3. Click “Search” button					
Search item found by date range	1. Click first calendar icon and select date from date picker	“”	No change in number of items		No change in number of items	PASS

with empty value	2. Click second calendar icon and select date from date picker	""				
	3. Click "Search" button					
Search item found by keyword	1. Enter keyword	"bottle"	All items where the name matches "bottle" are shown		All items where the name matches "bottle" are shown	PASS
	2. Press "Enter"					
Search item found by keyword which is not match with all records	1. Enter keyword which is not match with all records	"Laptop"	Message "No record found" is shown		Message "No record found" is shown	PASS
	2. Press "Enter"					
Search item found by keyword with empty value	1. Enter keyword with empty value	""	No change in number of items		No change in number of items	PASS
	2. Press "Enter"					

Table 7.6: Unit Test Case – Create, Edit and Archive Item Found

Test Case ID:	TC006	Test Designed by:	Chin Yun Ting
Test Priority:	High	Test Designed date:	21 st August 2020
Module Name:	Item Found Module	Test Executed by:	Chin Yun Ting
Test Title:	Test Create, Edit and Archive Item Found	Text Execution date:	24 th August 2020
Pre-condition:			
User is required to login into the system as admin			

User is required to select the “Item Found” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
Create Item Found with all valid value	1. Click “Add New Item” button		New item found created	User is redirected to item found page	New item found created	PASS
	2. Enter item name, item category, description, location found, date found, person to claim item and location to claim item	“Key”, “Keys”, “A bunch of silver key”, “KB500”, “08/10/2020”, “Alice”, “DSS”				
	3. Upload item image					
	4. Click “Submit” button					
Create Item Found with all empty value	1. Click “Add New Item” button		Error message “The field is required” is shown		Error message “Th field is required” is shown	PASS
	2. Enter empty item name, item category, description, location found, date found, person to claim item and location to claim item	“”				
	3. Click “Submit” button					
	1. Click edit icon					PASS

Edit Item Found with valid value	2. Change item name	“Keychain”	The selected item name is updated	User is redirected to item found page	The selected item name is updated	
	3. Click “Submit” button					
Edit Item Found with empty value	1. Click edit icon		Error message “The name field is required” is shown		Error message “The name field is required” is shown	PASS
	2. Change empty item name	“”				
	3. Click “Submit” button					
Archive item found with confirm	1. Click archive icon		The selected item is archived		The selected item is archived	PASS
	2. Click “OK” for confirmation box					
Archive item found without confirm	1. Click archive icon		No item is archived		No item is archived	PASS
	2. Click “Cancel” for confirmation box					

Table 7.7: Unit Test Case – Test Claim Item

Test Case ID:	TC007	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Claim Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test Claim Item	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system						
User is required to click the “Claim” button from “Item Found” details page						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status

Claim item with valid claim date	1. Enter claim date	08/30/2020	The claim form is successfully submitted	User is redirected to item found page	The claim form is successfully submitted	PASS
	2. Click “Submit” button					
Claim item with the claim date before today	1. Enter claim date	01/01/2020	Error message		Error message	PASS
	2. Click “Submit” button		“The claim date must be a date after or equal to today” is shown		“The claim date must be a date after or equal to today” is shown	
Claim item with empty claim date	1. Enter claim date	“”	Error message		Error message	PASS
	2. Click “Submit” button		“Please fill out this field” is shown		“Please fill out this field” is shown	

Table 7.8: Unit Test Case – Test Claim Item

Test Case ID:	TC008	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Claim Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test Search Claim Record	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system as admin						
User is required to select the “Claim Record” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
Search claim record by claim id	1. Enter claim id	“C003”	Claim records where the claim id matches		Claim records where the claim id matches	PASS
	2. Press Enter					

			“C003” are shown		“C003” are shown	
Search claim record by claim id which is not match with all records	1. Enter claim id	“C010”	Message “No record found” is shown		Message “No record found” is shown	PASS
	2. Press Enter					
Search claim record by claim id with empty value	1. Enter claim id	“”	No change in the number of claim records		No change in the number of claim records	PASS
	2. Press Enter					
Search claim record by name	1. Enter name	“spectacles”	Claim records where the name matches “spectacles” are shown		Claim records where the name matches “spectacles” are shown	
	2. Press Enter					
Search claim record by name which is not match with all records	1. Enter name	“laptop”	Message “No record found” is shown		Message “No record found” is shown	
	2. Press Enter					
Search claim record by name with empty value	1. Enter name	“”	No change in the number of claim records		No change in the number of claim records	PASS
	2. Press Enter					
Search claim record by name	1. Enter name	“Spectacles”	Claim records where the name matches		Claim records where the name matches	PASS

	2. Press Enter		“Spectacles” are shown		“Spectacles” are shown	
Search claim record by name which is not match with all records	1. Enter name	“Lap top”	Message “No record found” is shown		Message “No record found” is shown	PASS
	2. Press Enter					
Search claim record by name with empty value	1. Enter name	“”	No change in the number of claim records		No change in the number of claim records	PASS
	2. Press Enter					
Search claim record by category	1. Select category from dropdown lost	Eye wear	Claim records which is under “Eyewear” category are shown		Claim records which is under “Eyewear” category are shown	PASS
Search claim record by category which is not match with all records	1. Select category from dropdown lost	Clot hing	Message “No record found” is shown		Message “No record found” is shown	PASS
Search claim record by claim date	1. Click calendar icon in the search box	08/1 9/20 20	Claim records where the claim date matches		Claim records where the claim date matches	PASS
	2. Select the date form datepicker		“08/19/2020” are shown		“08/19/2020” are shown	

Search claim record by claim date which is not match with all records	1. Click calendar icon in the search box	12/1 2/20 20	Message “No record found” is shown		Message “No record found” is shown	PASS
	2. Select the date form datepicker					
Search claim record by owner info	1. Enter owner information	“Yun Ting”	Claim records where the owner info matches “Yun Ting” are shown		Claim records where the owner info matches “Yun Ting” are shown	PASS
	2. Press Enter					
Search claim record by owner info which is not match with all records	1. Enter owner information	“Tan Ah Kow”	Message “No record found” is shown		Message “No record found” is shown	PASS
	2. Press Enter					
Search claim record by owner info with empty value	1. Enter owner information	“”	Message “No record found” is shown		Message “No record found” is shown	PASS
	2. Press Enter					
Search claim record by status	1. Select status from dropdown list	Pending	Claim records where the status is “Pending” are shown		Claim records where the status is “Pending” are shown	PASS

Search claim record by status which is not match with all records	1. Select status from dropdown list	Claimed	Message “No record found” is shown		Message “No record found” is shown	PASS
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Table 7.9: Unit Test Case – Test Archive Claim

Test Case ID:	TC009	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Claim Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test Archive Claim	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system as admin						
User is required to select the “Claim Record” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
Archive item found with confirm	1. Click archive icon		The selected claim record is archived		The selected claim record is archived	PASS
	2. Click “OK” for confirmation box	“OK”				
Archive item found without confirm	1. Click archive icon		No claim record is archived		No claim record is archived	PASS
	2. Click “Cancel” for confirmation box	“Cancel”				

Table 7.10: Unit Test Case – Test View and Search Lost Case

Test Case ID:	TC010	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Lost Case Module	Test Executed by:	Chin Yun Ting			

Test Title:	Test View and Search Lost Case	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system						
User is required to select the “Lost Case” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
View lost case details	1. Click “Details” button of item		Item image, item name, item category, item description, date and location lost and owner info are shown	User is redirected to item details page	Item image, item name, item category, item description, date and location lost and owner info are shown	PASS
Search lost case by category	1. Click “Show All Categories” button	“Keys”	All items under “Keys” category is shown		All items under “Keys” category is shown	PASS
	2. Select item category					
Search lost case by category which is not match with all records	1. Click “Show All Categories” button		Message “No record found” is shown		Message “No record found” is shown	PASS
	2. Select item category	“Bags & Back packs”				
Search lost case by date range	1. Click first calendar icon and select date from date picker	08/10 /2020	All items found within		All items found within	PASS

	2. Click second calendar icon and select date from date picker	18/13/2020	08/10/2020 and 18/13/2020 are shown		08/10/2020 and 18/13/2020 are shown	
	3. Click “Search” button					
Search lost case by date range which is not match with all records	1. Click first calendar icon and select date from date picker	12/01/2020	Message “No record found” is shown		Message “No record found” is shown	PASS
	2. Click second calendar icon and select date from date picker	12/31/2020				
	3. Click “Search” button					
Search lost case by date range with empty value	1. Click first calendar icon and select date from date picker	“”	No change in the number of lost cases		No change in the number of lost cases	PASS
	2. Click second calendar icon and select date from date picker	“”				
	3. Click “Search” button	“”				
Search lost case by keyword	1. Enter keyword	“bottle”	All items where the name matches “bottle” are shown		All items where the name matches “bottle” are shown	PASS
	2. Press “Enter”					

Search lost case by keyword which is not match with all records	1. Enter keyword which is not match with all records	“Laptop”	Message “No record found” is shown		Message “No record found” is shown	PASS
	2. Press “Enter”					
Search lost case by keyword with empty value	1. Enter keyword with empty value	“”	No change in the number of lost cases		No change in the number of lost cases	PASS
	2. Press “Enter”					

Table 7.11: Unit Test Case – Test Report Lost Case

Test Case ID:	TC011	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Lost Case Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test Report Lost Case	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system						
User is required to select the “Report Your Lost” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
Report lost case with all valid value	1. Enter valid item name, item category, description, possible location, date lost	“Key”, “Keys”, “With red keychain”, “KB100”, “08/11/2020”	New lost case is created	User is redirected to “Lost Case” page	New lost case is created	PASS
	2. Upload item image					

	3. Click “Submit” button					
Report lost case with empty value	1. Enter empty item name, item category, description, possible location, date lost	“”	Error message “The field is required” is shown		Error message “The field is required” is shown	PASS
	2. Click “Submit” button					

Table 7.12: Unit Test Case – Test Archive Lost Case

Test Case ID:	TC012	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Lost Case Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test Archive Lost Case	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system as admin						
User is required to select the “Lost Case” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
Archive lost case with confirm	1. Click archive icon		The selected lost case is archived		The selected lost case is archived	PASS
	2. Click “OK” for confirmation box	“OK”				
Archive lost case without confirm	1. Click archive icon		No lost case is archived		No lost case is archived	PASS
	2. Click “Cancel” for confirmation box	“Cancel”				

Table 7.13: Unit Test Case – Test View and Search Item for Sale

Test Case ID:	TC013	Test Designed by:	Chin Yun Ting PASS			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Item for Sale Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test View and Search Item for Sale	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system						
User is required to select the “Item for Sale” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
View item for sale details	1. Click “Details” button of item		Item image, item name, item category, item description, starting bid, current bid and bid end date are shown	User is redirected to item details page	Item image, item name, item category, item description, starting bid, current bid and bid end date are shown	PASS
Search item for sale by category	1. Click “Show All Categories” button	“Clothing”	All items under “Clothing” category is shown		All items under “Clothing” category is shown	PASS
	2. Select item category					
Search item for sale by category which is not match with all records	1. Click “Show All Categories” button		Message “No record found” is shown		Message “No record found” is shown	PASS
	2. Select item category					

Search item for sale by keyword	1. Enter keyword	“jack et”	All items where the name matches “jacket” are shown		All items where the name matches “jacket” are shown	PASS
	2. Press “Enter”					
Search item for sale by keyword which is not match with all records	1. Enter keyword which is not match with all records	“bottle”	Message “No record found” is shown		Message “No record found” is shown	PASS
	2. Press “Enter”					
Search item for sale by keyword with empty value	1. Enter keyword with empty value	“”	No change in the number of items for sale		No change in the number of items for sale	PASS
	2. Press “Enter”					

Table 7.14: Unit Test Case – Test Bid Item for Sale

Test Case ID:	TC014	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Item for Sale Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test Bid Item for Sale	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system						
User is required to select the “Item for Sale” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
	1. Enter bid amount	40.50		User is redirected to		PASS

Bid item with valid bid amount	2. Click “Bid” button		New bid with RM40.50 is placed	item for sale page	New bid with RM40.50 is placed	
Bid item with bid amount which is less than current bid	1. Enter bid amount	5.50	Error message “Your bid amount must be more than current bid” is shown		Error message “Your bid amount must be more than current bid” is shown	PASS
	2. Click “Bid” button					
Bid item with bid amount which is same as current price	1. Enter bid amount	35.00	Error message “Your bid amount must be more than current bid” is shown		Error message “Your bid amount must be more than current bid” is shown	PASS
	2. Click “Bid” button					
Bid item with empty bid amount	1. Enter bid amount	“”	Error message “The bid amount is required” is shown		Error message “The bid amount is required” is shown	PASS
	2. Click “Bid” button					

Table 7.15: Unit Test Case – Test Approve Item for Sale

Test Case ID:	TC015	Test Designed by:	Chin Yun Ting
Test Priority:	High	Test Designed date:	21 st August 2020
Module Name:	Item for Sale Module	Test Executed by:	Chin Yun Ting
Test Title:	Test Approve Item for Sale	Text Execution date:	24 th August 2020
Pre-condition:			
User is required to login into the system as admin			
User is required to click the “Approve for Sell” button in the “Item for Sale” page			
Test Case Summary	Test Steps	Test Data	Expected Result
			Post-condition
			Actual Result
			Status

Approve the item for sale with valid starting bid and valid bid end date	1. Enter valid starting bid	10.00	The item is approved for sale	User is redirected to item for sale page	The item is approved for sale	PASS
	2. Enter valid bid end date	09/30/2020				
	3. Click "Submit" button					
Approve the item for sale with valid starting bid and invalid bid end date	1. Enter valid starting bid	10.00	Error message		Error message	PASS
	2. Enter invalid bid end date	01/01/2020	"The bid end date must be a date after or equal to today" is shown		"The bid end date must be a date after or equal to today" is shown	
	3. Click "Submit" button					
Approve the item for sale with invalid starting bid and valid bid end date	1. Enter invalid starting bid	"ten"	Error message		Error message	PASS
	2. Enter valid bid end date	09/30/2020	"The bid starting price must be a number" is shown		"The bid starting price must be a number" is shown	
	3. Click "Submit" button					
Approve the item for sale with invalid starting bid and invalid bid end date	1. Enter invalid starting bid	"ten"	Both error messages		Both error messages	PASS
	2. Enter invalid bid end date	01/01/2020	"The bid starting price must be a number" and "The bid end date must be a		"The bid starting price must be a number" and "The bid end date must be a	
	3. Click "Submit" button					

			date after or equal to today” are shown		date after or equal to today” are shown	
Approve the item for sale with empty starting bid and bid end date	1. Enter empty starting bid	“”	Both error messages		Both error messages	PASS
	2. Enter empty bid end date	“”	“The bid starting		“The bid starting	
	3. Click “Submit” button		price is required” and “The bid end date field is required” are shown		price is required” and “The bid end date field is required” are shown	

Table 7.16: Unit Test Case – Test Update Profile

Test Case ID:	TC016	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Profile Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test Update Profile	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system						
User is required to select the “Profile” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
Update profile with valid name, email and contact number	1. Enter valid name	“Chin Yun Ting”	Profile with new name, email and contact	User is redirected to profile page	Profile with new name, email and contact	PASS
	2. Enter valid email	“yting98@1utar.my”				
	3. Enter valid contact number	“0123456789”				

	4. Click “Submit” button		number is updated		number is updated	
Update profile with valid name, and email but invalid contact number	1. Enter valid name	“Chin Yun Ting”	Error message		Error message	PASS
	2. Enter valid email	“yting98@lutar.my”	“The contact		“The contact	
	3. Enter invalid contact number	“zero one two”	no must be a		no must be a	
	4. Click “Submit” button		number” is shown		number” is shown	
Update profile with valid name, and contact number but invalid email	1. Enter valid name	“Chin Yun Ting”	Error message		Error message	PASS
	2. Enter invalid email	“yting98-lutar.my”	“The email		“The email	
	3. Enter valid contact number	“0123456789”	must be a valid		must be a valid	
	4. Click “Submit” button		email address” is shown		email address” is shown	
Update profile with empty name, contact number and email	1. Enter empty name	“”	Error messages		Error messages	PASS
	2. Enter empty email	“”	“The name field is required”		“The name field is required”	
	3. Enter empty contact number	“”	, “The email field is required”		, “The email field is required”	
	4. Click “Submit” button		and “The contact no field is required”		and “The contact no field is required”	

			are shown		are shown	
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Table 7.17: Unit Test Case – Test Change Password

Test Case ID:	TC017	Test Designed by:	Chin Yun Ting			
Test Priority:	High	Test Designed date:	21 st August 2020			
Module Name:	Profile Module	Test Executed by:	Chin Yun Ting			
Test Title:	Test Change Password	Text Execution date:	24 th August 2020			
Pre-condition:						
User is required to login into the system as admin						
User is required to select the “Profile” section from homepage						
Test Case Summary	Test Steps	Test Data	Expected Result	Post-condition	Actual Result	Status
Change password with valid current password	1. Enter valid current password	“123456”	Password is updated	User is redirected to profile page	Password is updated	PASS
	2. Enter new password	“new pass”				
	3. Enter re-enter password	“new pass”				
	4. Click “Update” button					
Change password with invalid current password	1. Enter invalid current password	“myp ass”	Error message “Your current password does not match with the password you		Error message “Your current password does not match with the password you	PASS
	2. Enter new password	“new pass”				
	3. Enter re-enter password	“new pass”				
	4. Click “Update” button					

			provided. Please try again” is shown		provided. Please try again” is shown	
Change password with the new password matches with the reenter password	1. Enter valid current password	“123456”	Password is updated	User is redirected to profile page	Password is updated	PASS
	2. Enter new password	“new pass”				
	3. Enter re-enter password	“new pass”				
	4. Click “Update” button					
Change password with the new password does not match with the re-enter password	1. Enter valid current password	“123456”	Error message “Your new password does not match with the re-enter password. Please try again” is shown		Error message “Your new password does not match with the re-enter password. Please try again” is shown	PASS
	2. Enter new password	“new pass”				
	3. Enter re-enter password	“new pass word”				
	4. Click “Update” button					
Change password with empty current password,	1. Enter empty current password	“”	Error message “Please fill out this		Error message “Please fill out this	PASS
	2. Enter empty new password	“”				

new password	3. Enter empty re- enter password	“”	field” is shown		field” is shown	
and re-enter password	4. Click “Update” button					

7.3 Integration Testing

Table 7.18: Integration Test Case

Test Case	Test Steps	Expected Result	Status
Register New Account	<ol style="list-style-type: none"> 1. User enters the system 2. User clicks “Register” in navigation bar 3. User enters “Chin Yun Ting” for name field 4. User enters “yting98@lutar.my” for email field 5. User enters 0128871268 for contact no field 6. User enters “123456” for password field 7. User enters “123456” for confirm password field 8. User clicks “Register” button 	New account is created. A verification email is sent to user.	PASS
Login	<ol style="list-style-type: none"> 1. User opens email 2. User clicks the link inside email to redirect to the system 3. User enters “yting98@lutar.my” for email field 4. User enters “123456” for password field 5. User clicks “Login” button 	User account is verified. User is redirected to the homepage	PASS
View Announcement	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Announcement” section from homepage 3. User clicks the announcement subject 	All announcements are listed in table format. User is redirected to view the content with attachments when the subject is clicked.	PASS
Search Announcement by Date	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Announcement” section from homepage 3. User clicks the calendar icon in search box 	All announcements which are posted on 08/17/2020 are shown	PASS

	4. User selects 08/17/2020 from datepicker		
Search Announcement by Subject	5. User logs into the system 1. User clicks the “Announcement” section from homepage 2. User enters “student” in the subject search box 3. User presses “Enter”	All announcements which contains “student” in the subject are shown	PASS
Search Announcement by Department	1. User logs into the system 2. User clicks the “Announcement” section from homepage 3. User enters “safety” in the department search box 4. User presses “Enter”	All announcements which contains “Safety” in the department are shown	PASS
View Item Found	1. User logs into the system 2. User clicks the “Item Found” section from homepage 3. User clicks the “Details” button of item	All items are shown. User is redirected to view the item details when the “Details” button is clicked.	PASS
Search Item Found by Category	1. User logs into the system 2. User clicks the “Item Found” section from homepage 3. User clicks “Show All Categories” button 4. User selects “Keys”	All items under “Keys” category are shown	PASS
Search Item Found by Date Range	1. User logs into the system 2. User clicks the “Item Found” section from homepage 3. User clicks first calendar icon 4. User selects 08/10/2020 from datepicker 5. User clicks second calendar icon of the search box 6. User selects 08/13/2020 from datepicker 7. User clicks “Search” button	All items found within 08/10/2020 and 08/13/2020 are shown	PASS

Search Item Found by Keyword	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Item Found” section from homepage 3. User enters “bottle” in the search box 4. User presses “Enter” 	All items where the name matches “bottle” are shown	PASS
Claim Item	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Item Found” section from homepage 3. User clicks the “Details” button of item 4. User clicks “Claim” button 5. User select 08/31/2020 from datepicker as claim date 6. User clicks “Submit” button 	The item is claimed.	PASS
View Lost Case	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Lose Case” section from homepage 3. User clicks the “Details” button of item 	All items are shown. User is redirected to view the item details when the “Details” button is clicked.	PASS
Report Lost Item	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Report Lost” section from homepage 3. User enters “Wireless Mouse” for name field 4. User selects “Computers & Electronic” for category field 5. User enters “Logitech Wireless Mouse” for description field 6. User enters “KB300” for possible location field 7. User enters “08/17/2020” for date lost field 8. User uploads item image 9. User clicks “Submit” button 	A new lost case is updated. User is redirected to “Lost Case” page	PASS

Search Case Category Lost by	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Lost Case” section from homepage 3. User clicks “Show All Categories” button 4. User selects “Keys” 	All items under “Keys” category are shown	PASS
Search Case Range Lost by Date	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Lost Case” section from homepage 3. User clicks first calendar icon 4. User selects 08/10/2020 from datepicker 5. User clicks second calendar icon of the search box 6. User selects 08/14/2020 from datepicker 7. User clicks “Search” button 	All items found within 08/10/2020 and 08/14/2020 are shown	
Search Case Keyword Lost by	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Lost Case” section from homepage 3. User enters “bottle” in the search box 4. User presses “Enter” 	All items where the name matches “bottle” are shown	PASS
View Item for Sale	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Item for Sale” section from homepage 3. User clicks the “Details” button of item 	All items are shown. User is redirected to view the item details when the “Details” button is clicked.	PASS
Search Item for Sale Category by	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Item for Sale” section from homepage 3. User clicks “Show All Categories” button 4. User selects “Clothing” 	All items under “Clothing” category are shown	PASS
Search Item for Sale Keyword by	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Item for Sale” section from homepage 	All items where the name matches “jacket” are shown	PASS

	<ol style="list-style-type: none"> 3. User enters “jacket” in the search box 4. User presses “Enter” 		
Bid Item for Sale	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Item for Sale” section from homepage 3. User clicks the “Details” button of item 4. User enters RM 50.00 as bid amount 5. User clicks “Bid” button 6. User clicks “Confirm” 	A new bid is placed. The current bid price of item is changed to RM 50.00.	PASS
Update Profile	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Profile” section from homepage 3. User clicks edit icon 4. User enters “0123456789” for contact number field 5. User clicks “Submit” button 	The profile with new contact number “0123456789” is updated.	PASS
Change Password	<ol style="list-style-type: none"> 1. User logs into the system 2. User clicks the “Profile” section from homepage 3. User clicks “Change Password” button 4. User enters “123456” for current password field 5. User enters “userpass” for new password field 6. User enters “userpass” for re-enter password field 7. User clicks “Update” button 	The password is changed to “userpass”	PASS
Post New Announcement	<ol style="list-style-type: none"> 1. User logs into the system as admin 2. User clicks the “Announcement” section 3. User clicks the “Post New Announcement” button 4. User enters announcement subject for the subject field 	A new announcement is posted	PASS

	<ol style="list-style-type: none"> 5. User enters announcement content for the content field 6. User uploads the attachment 7. User clicks “Post” button 		
Edit Announcement	<ol style="list-style-type: none"> 1. User logs into the system as admin 2. User clicks the “Announcement” section 3. User clicks edit icon 4. User enters new announcement subject for the subject field 5. User clicks “Post” button 	The selected announcement is updated	PASS
Archive Announcement	<ol style="list-style-type: none"> 1. User logs into the system as admin 2. User clicks the “Announcement” section 3. User clicks archive icon 4. User clicks “OK” for confirmation box 	The selected announcement is archived	PASS
Create New Item Found	<ol style="list-style-type: none"> 5. User logs into the system as admin 6. User clicks the “Item Found” section 7. User clicks “Add New Item” 8. User enters “Key” for name field 9. User selects “Keys” for category field 10. User enters “A bunch of silver key” for description field 11. User enters “KB500” as location found field 12. User enters “08/16/2020” as date found field 13. User enters “Lee Mei Hao” for person to claim field 14. User enters “Library main counter” for location to claim field 15. User clicks “Submit” button 	A new item found is updated	PASS
Edit Item Found	<ol style="list-style-type: none"> 1. User logs into the system as admin 2. User clicks the “Item Found” section 3. User clicks edit icon 4. User enters “KB300” for location found field 	The item with new location found “KB300” is updated	PASS

		5. User clicks “Submit” button		
Archive Item Found		1. User logs into the system as admin 2. User clicks the “Item Found” section 3. User clicks “Confirm” for confirmation box	The selected item is archived	PASS
Archive Lost Case		1. User logs into the system as admin 2. User clicks the “Lost Case” section 3. User clicks “Confirm” for confirmation box	The selected lost case is archived	PASS
Archive Claim Record		1. User logs into the system as admin 2. User clicks the “Claim Record” section 3. User clicks “Confirm” for confirmation box	The selected claim record is archived	PASS
Approve Expired Item for Sale		1. User logs into the system as admin 2. User clicks the “Item for Sale” section 3. User clicks “Approve for Sell” button 4. User enters “10.00” for starting bid field 5. User enters “09/31/2020” for bid end date field	The selected item is opened for user to place the bid	PASS
Edit Item for Sale		1. User logs into the system as admin 2. User clicks the “Item for Sale” section 3. User clicks edit icon 4. User enters “09/30/2020” for bid end date field 5. User clicks “Submit” button	The bid end date of the item is changed to “09/30/2020”	PASS
Archive Item for Sale		1. User logs into the system as admin 2. User clicks the “Item for Sale” section 3. User clicks “Confirm” for confirmation box	The selected item is archived	PASS

7.4 User Acceptance Testing

User acceptance testing was conducted to evaluate whether the system design meets user requirements. 15 users were selected to test on the web application as well as the mobile application. During user acceptance testing, some comments were collected from users. The result of the user acceptance test will be analyzed and discussed in this section. The test cases for both admins and students were attached to Appendix D and Appendix E respectively.

Table 7.19: User Acceptance Test Result for Admins

Test Module	Number of Tests Conducted	Number of Tests Passed	Comments Provided
Login	15	15	-
Announcement	15	15	-
Item Found	15	15	-
Lost Case	15	15	-
Claim Record	15	15	-
Item for Sale	15	15	-
Profile	15	15	-

Table 7.20: User Acceptance Test Result for Students

Test Module	Number of Tests Conducted	Number of Tests Passed	Comments Provided
Register	15	15	- No email verification for mobile registration
Login	15	15	-
Announcement	15	15	- No attachment in mobile
Item Found	15	15	- Suggest to search by category, date and keyword at the same time
Claim Item	15	15	-
Lost Case	15	15	- Suggest to search by category, date and keyword at the same time
Report Lost	15	15	-
Item for Sale	15	15	- Suggest to search by category and keyword at the same time
Bid Item	15	15	-
Profile	15	15	-

CHAPTER 8

CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

UTAR lost and found management system contributes to all UTAR staff and students. It digitalizes the manual process in managing and organizing the lost and found items. Furthermore, it also provides a platform for UTAR staff and students to search for the lost and found items efficiently and effectively.

For the department staff, they only require to insert the item details with an image to post a new item in the system. The system will generate an item id once a new item is updated so the department staff can have a clear identification for each item. All data in this system will be up to date. If someone claims the item, the post will be taken down as it is pending for the owner to claim back their item. Furthermore, the department staff can also decide to sell the lost and found items if they have no claim for a long time. It can prevent too many unclaimed items accumulate in the department.

The other benefit of the system is item labelling and item categorization were applied in the system for better searching. Thus, for anyone who lost an item in UTAR, they can search items based on different options such as item category, date range or keyword. It enables an accurate item can be delivered to users so they can get back their items in a more efficient way. They can also submit the claims 24/7 rather than only restricted to office hours so the item is reserved for them to claim back at the department. If they claim the item, they will be able to know where their item is located so they can get back the item without hassle.

8.2 Recommendations for Future Work

The system was developed based on the project specification stated in Chapter 4. However, the system still has some limitations that can be improved in the future. Table 8.1 shows the system limitations as well as the recommendations for future work.

Table 8.1: System Limitations and Recommendations for Future Work

No	Limitations	Recommendations
1	No email notification	The system currently does not have email notification to inform users of the latest status. For example, when users claim an item, the system can send an email to remind them of the claim date as well as the location to claim the item. Email notification can also be applied when users report a new lost case or win an auction item.
2	Users should contact the owner of the lost case personally	If users found the item listed in the lost case section, they should contact the owner personally through email or contact number to return back the items. The system can develop a chat box so users can communicate directly with others in the system.
3	The system cannot generate report	The system can generate a PDF report to provide at-a-glance views of lost and found performance. It can be a weekly, monthly, quarterly or yearly report. System admin can view the number of claim cases, total auction income, the most common lost items in UTAR based on the system report.
4	Users cannot search items by category, date range and keyword at once	<p>The system can allow users to select more than one search option to filter the item. It is useful to filter out a large number of items that are not related to users. For example, if a user wants to find a jacket which is lost on 1st September 2020, he can:</p> <ol style="list-style-type: none"> 1. Select “Clothing” for category 2. Select “01/09/2020” until today date from date picker 3. Enter “Jacket” for keyword 4. Click “Search” button <p>It allows users to search the items accurately within a short period of time.</p>

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APPENDICES

APPENDIX A: Questionnaire

2/27/2020

Lost and Found Management System Survey

Lost and Found Management System Survey

Thank you for participating in this survey.

I am Yun Ting from Software Engineering, a final year student who is currently working on my Final Year Project (FYP) to introduce a lost and found management system to UTAR. I would like to conduct this survey to gather more valuable information and opinion.

This survey will only take less than 10 minutes. Your help is much appreciated. Thank you.

***Required**

1. How do you usually find the lost and found information in UTAR? *

Mark only one oval.

- Department of Safety and Security (DSS) *Skip to question 4*
- Facebook pages *Skip to question 2*
- Facebook groups *Skip to question 3*
- Other: _____

2. Please specify the Facebook page name. *

Skip to question 4

3. Please specify the Facebook group name.

Skip to question 4

2/27/2020

Lost and Found Management System Survey

4. What is the problem you encounter when you try to find the lost and found items in UTAR? *

5. How do you comment the lost and found information posted on Facebook? *

Mark only one oval.

- Hard to access. The information is scattered and unorganized.
- It's all right.
- Easy to access. I have no issue.

6. Do you think that students can see their lost items advertised on Facebook? *

Mark only one oval.

	1	2	3	4	5	
Definitely cannot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Definitely can

2/27/2020

Lost and Found Management System Survey

7. Select the three most important components that should be included in lost and found advertisement. *

Tick all that apply.

- Item image
 Item category (E.g. Mobile devices, Keys, IDs & Cards)
 Item name (E.g. iPhone 8, Honda Car Key, Student ID)
 Item description (E.g. A bunch of keys with red keychain)
 Location found
 Date found
 Item status (E.g. Claimed, Available)

Other: _____

8. If you were to choose a platform to access all lost and found information in UTAR, which one do you prefer the most? *

Mark only one oval.

- Web application
 Mobile application

9. What are the features you expect in a lost and found application? *

2/27/2020

Lost and Found Management System Survey

10. Do you think an accurate search functionality in application can improve the deliverability of lost and found information to students?

Mark only one oval.

Yes

No

This content is neither created nor endorsed by Google.

Google Forms

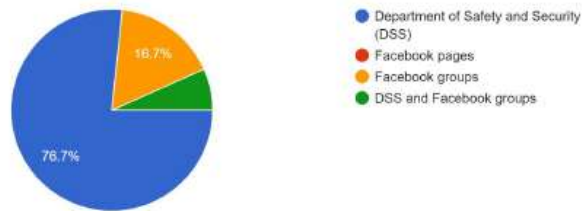
APPENDIX B: Result of Questionnaire

Lost and Found Management System Survey

30 responses

How do you usually find the lost and found information in UTAR?

30 responses



What is the problem you encounter when you try to find the lost and found items in UTAR?

30 responses

No issue.

It is time-consuming because I should frequently go to department to find my items.

Hard to see my items on Facebook

Normally the item is hard to be found

Don't know where to collect the information

Sometimes Inconvenient to walk to DSS

Hard to search information.

Advertisements on Facebook are too messy

Cannot get all lost and found information in a platform

No image provided

Need to go DSS many times to check my items

Hard to find my items

Only can find lost item on DSS, but sometime I lazy go to DSS department

Can't find my items

Some people are lazy to hand over the items to relevant department

Too many information

Sometime lost item cannot be found at DSS

Hard to access. Don't know where to get the information.

Sometime hard to get information of the lost item.

inconvenient to Department of Safety and Security

Cannot get latest information from DSS

Cannot check information immediately

-

When I lost something at school and I can't find it at the spot I left it.

Hard to find

No idea

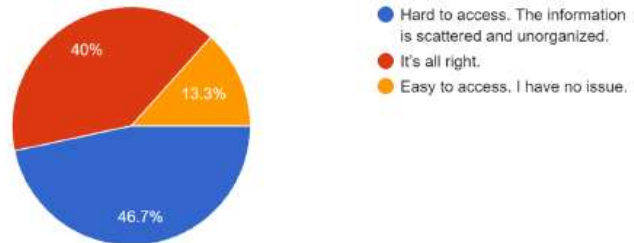
Can't find my items although I go DSS

Not enough descriptions.

Lost item may pick up by student and not passing to DSS

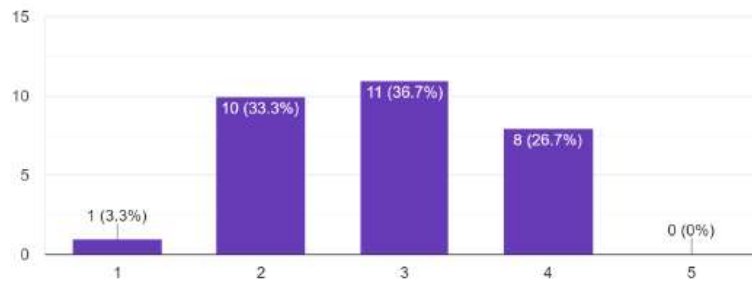
How do you comment the lost and found information posted on Facebook?

30 responses



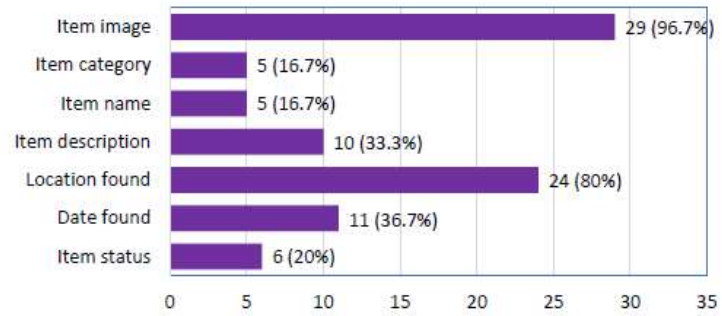
Do you think that students can see their lost items advertised on Facebook?

30 responses



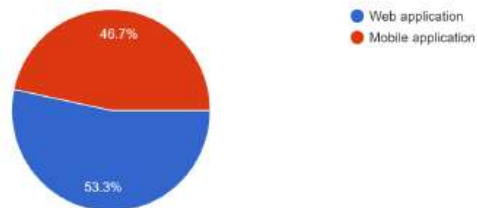
Select the three most important components that should be included in lost and found advertisement.

30 responses



If you were to choose a platform to access all lost and found information in UTAR, which one do you prefer the most?

30 responses



What are the features you expect in a lost and found application?

30 responses

Receive notification if items found

Well-organized items. Able to filter items.

Check who has claimed the item

Able to filter the lost items

User can see the return info of lost item.

Directly show the item images.

Search feature.

Search, filter and sort items

Search by keywords

Can access information anytime

Check items current status

Can tag other user.

Show lost and found items photos

Students can directly post advertisements in app. No need to hand over to department as some students are very lazy.

Register by student id

User who lost their item can also post picture to find back their lost item.

Can search based on keywords

Can get the contact of finder of lost item.

User friendly interface.

Can stated which item is already found

Allow students to post lost and found items

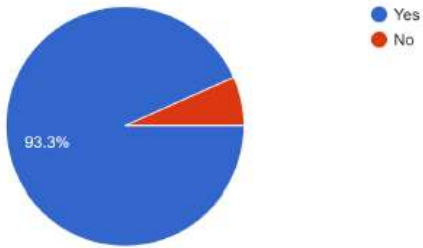
Can view & update lost and found items immediately.

Easy and convenient to use

- Item filter
- Can match the lost item image
- Location of my item
- Make appointment if I want to get back my items at DSS
- Able to organize all items in an application
- rules for disposal if no one claims a found item.
- Can filter items for better search

Do you think an accurate search functionality in application can improve the deliverability of lost and found information to students?

30 responses



APPENDIX C: Storyboard

Login

UTAR Lost N Found Management System

Email : admin@1utar.my

Password : ●●●●●●●●

Login

Enter email and password to login.

View Item

UTAR Lost N Found Management System

Login

Home

Sort by Date ▾

Show all categories ▾

Search by date

Search by keywords

Lost | Found

Image

Location found: KB100
Date found: 20/2/2020

Image

Location found: KB520
Date found: 14/1/2020

Image

Location found: Libran
Date found: 1/2/2020

UTAR Lost N Found Management System

Login

Home

Image

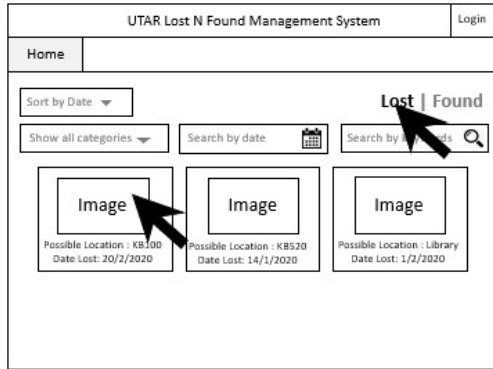
Item Name	iPhone 8 plus
Item Category	Mobile Devices
Description	With red color phone case
Location Found	KB100
Date Found	20/2/2020
Status	Available

Claim

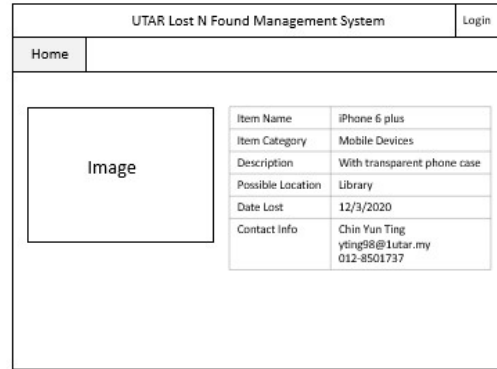
View Found Item

View Found Item (Details)

View Item

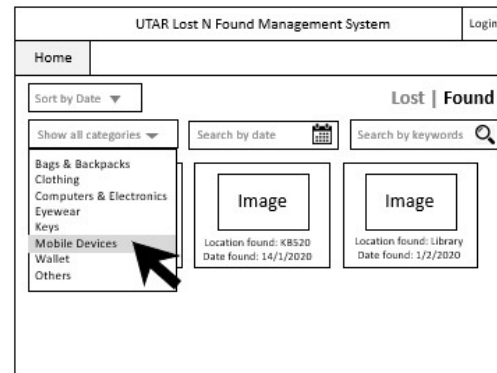
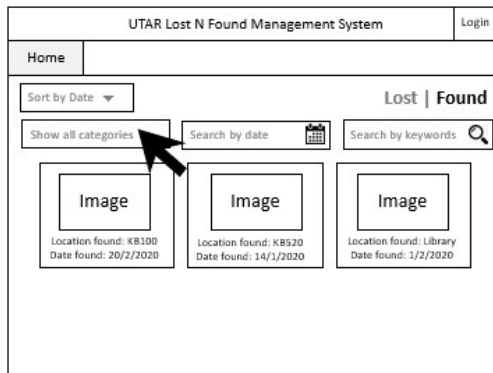


View Lost Item



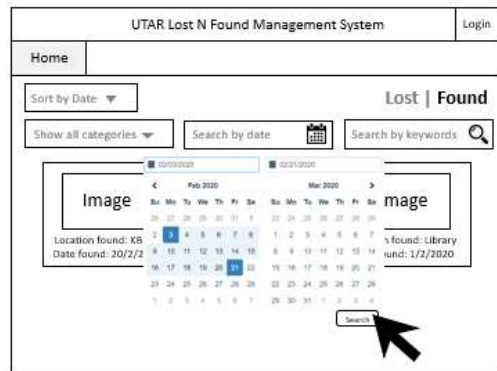
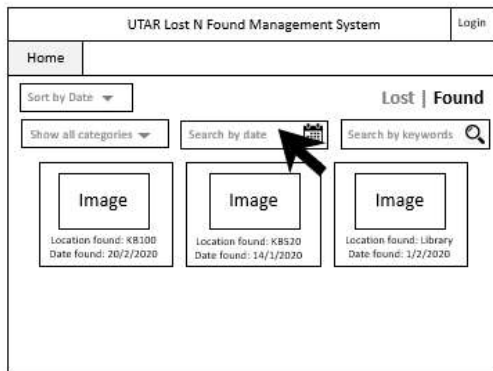
View Lost Item (Details)

Search by categories



Select "Mobile Devices" category from drop-down list

Search by date



Select date range from the calendar

Search by keyword

UTAR Lost N Found Management System

Home

Sort by Date ▼

Lost | Found

Show all categories ▼

Search by date

Search by keywords

Image

Location found: KB100
Date found: 20/2/2020

Image

Location found: KB520
Date found: 14/1/2020

Image

Location found: Library
Date found: 1/2/2020

Phone Image

Location found: KB100
Date found: 20/2/2020

Phone Image

Location found: KB520
Date found: 14/1/2020

Phone Image

Location found: Library
Date found: 1/2/2020

Enter keyword to search item

Sort by date

UTAR Lost N Found Management System

Home

Sort by Date ▼

Lost | Found

Show all categories ▼

Search by date

Search by keywords

Image

Location found: KB100
Date found: 13/1/2020

Image

Location found: KB520
Date found: 20/1/2020

Image

Location found: Library
Date found: 1/2/2020

Image

Location found: KB100
Date found: 1/2/2020

Image

Location found: KB520
Date found: 20/1/2020

Image

Location found: Library
Date found: 13/1/2020

All items are sort by date from newest to oldest as default.

User can click on "Sort by Date" button to sort from oldest to newest.

Claim Item

Click on "Claim" button.

Fill in claim form and submit.

UTAR Lost N Found Management System

Home

Item Name	iPhone 8 plus
Item Category	Mobile Devices
Description	With red color phone case
Location Found	KB100
Date Found	20/2/2020
Status	Available

Image

Claim

UTAR Lost N Found Management System

Home

Claim Form

Name* :

Student Id* :

Email* :

Contact Number* :

Claim Date* :

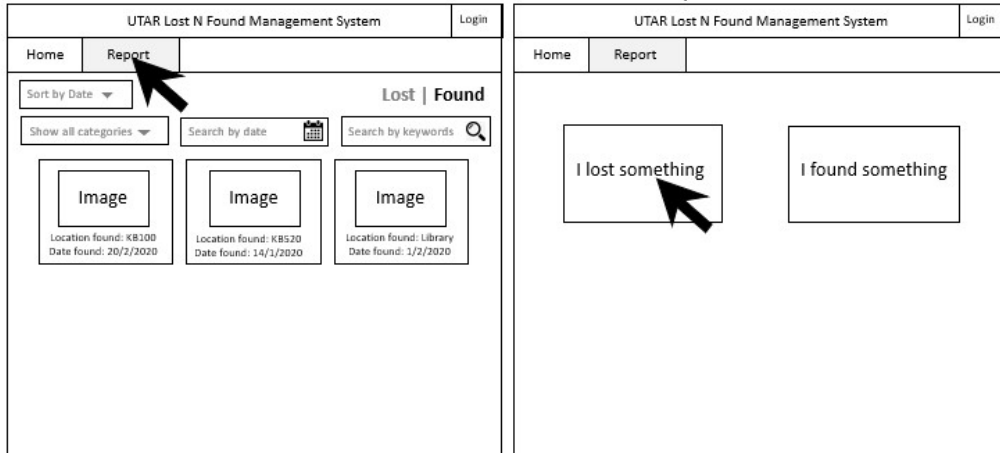
Claim

Report Lost

Click on "Report" tab.

Select "I lost something"

Fill in report form and submit.



The image shows a screenshot of the 'Report Lost Form' in the UTAR Lost N Found Management System. The form is titled 'Report Lost Form' and contains the following fields:

- Name* : Chin Yun Ting
- Student Id* : 1701169
- Email* : yting98@1utar.my
- Contact Number* : 012-8501737
- Item name* : iPhone 6 plus
- Item category* : Mobile Devices
- Description* : With transparent phone case.
- Possible Location* : Library
- Date Lost* : 12/3/2020
- Item image : Upload Image

At the bottom of the form is a 'Report' button, with an arrow pointing to it.

Report Found

Click on "Report" tab.

Select "I found something"

Fill in report form and submit.

UTAR Lost N Found Management System		Login
Home	Report	
Sort by Date ▼		Lost Found
Show all categories ▼	Search by date	Search by keywords
Image Location found: KB100 Date found: 20/2/2020	Image Location found: KB520 Date found: 14/1/2020	Image Location found: Library Date found: 1/2/2020
		I lost something
		I found something

UTAR Lost N Found Management System		Login
Home	Report Lost	
Report Found Form		
Name* :	<input type="text" value="Chin Yun Ting"/>	
Student Id* :	<input type="text" value="1701169"/>	
Email* :	<input type="text" value="yting98@utar.my"/>	
Contact Number* :	<input type="text" value="012-8501737"/>	
Item name* :	<input type="text" value="iPhone 6 plus"/>	
Item category* :	<input type="text" value="Mobile Devices"/>	
Description* :	<input type="text" value="With transparent phone case."/>	
Location Found* :	<input type="text" value="Library"/>	
Date Found* :	<input type="text" value="12/3/2020"/>	
Item Image* :	<input type="button" value="Upload Image"/>	
<input type="button" value="Report"/>		

Book Unclaimed Item

The left screenshot shows the 'Expired Item' tab selected in the 'UTAR Lost N Found Management System'. Below the navigation bar, there is a search bar and three item cards. The first card is labeled 'Image' with 'RM 10' below it. The second card is labeled 'Image' with 'RM 15' below it. The third card is labeled 'Image' with 'RM 20' below it. An arrow points to the 'Expired Item' tab, and another arrow points to the 'RM 20' card.

The right screenshot shows the details for the 'RM 20' item. It features a large 'Image' placeholder on the left. On the right, there is a table with the following data:

Item Name	Jacket
Item Category	Clothing
Description	Adidas women's jacket.
Selling Price	RM 20

Below the table is a 'Book' button. An arrow points to the 'Book' button.

Click on "Expired Item" tab.

Click on the item card to view details.

Click on "Book" button.

The 'Book Item Form' is displayed in the 'Expired Item' tab. It contains the following fields and values:

- Name*: Chin Yun Ting
- Student Id*: 1701169
- Email*: yting98@1utar.my
- Contact Number*: 012-3456789
- Payment Date*: 14/3/2020

At the bottom of the form is a 'Book' button. An arrow points to the 'Book' button.

Fill in book item form and submit.

Manage Unclaimed Item (Only for admin)

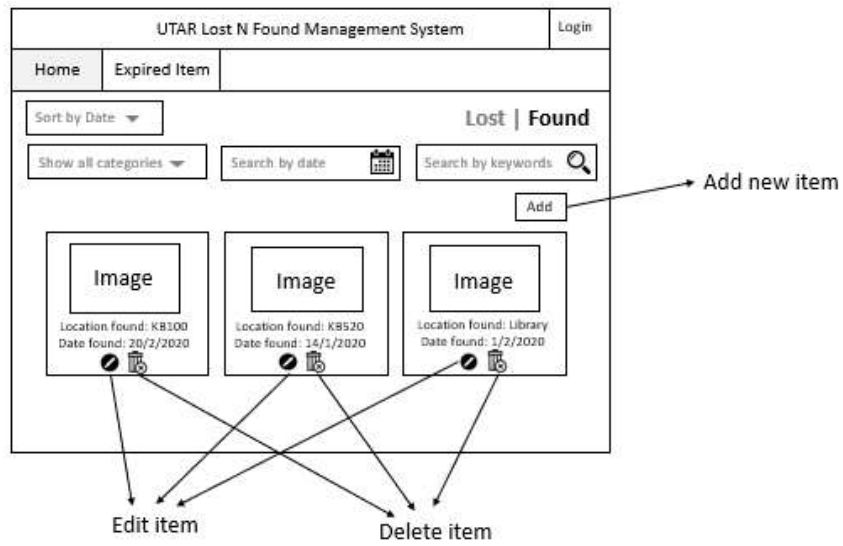
Click "Release" button to sell expired item.

Admin enters the selling price and click "Sell" button to sell.

Manage Claim (Only for admin)

Admin can edit claimed status.

Manage Found Item (Only for admin)



APPENDIX D: User Acceptance Test Case for Admin

Testing date			
Testing start time			
Testing end time			
Name of tester			
Test Module	Test Scenario	Pass/Fail	Comments
Login	1. Enter the credentials as below: <ul style="list-style-type: none"> Email: dss@utar.edu.my Password: adminpass. 		
Announcement	<u>Post Announcement</u> 1. Select "Announcement" section from homepage 2. Click "Post New Announcement" button 3. Enter subject 4. Enter content 5. Upload attachments 6. Click "Post" button		
	<u>Edit Announcement</u> 1. Select "Announcement" section from homepage 2. Click any edit icon to edit announcement 3. Update new announcement details 4. Click "Post" button		
	<u>Archive Announcement</u> 1. Select "Announcement" section from homepage 2. Click any archive icon to archive announcement 3. Click "OK" for confirmation box		
Item Found	<u>Add New Item</u> 1. Select "Item Found" section from homepage 2. Click "Add New Item" button 3. Enter name 4. Select Category 5. Enter Description 6. Enter Location Found 7. Enter Date Found 8. Enter the person who hold the item 9. Enter location to claim item 10. Upload image		
	<u>Edit Item Found</u> 1. Select "Item Found" section from homepage 2. Click any edit icon to edit item details 3. Update new item details 4. Click "Submit" button		
	<u>Archive Item Found</u> 1. Select "Item Found" section from homepage 2. Click any archive icon to archive item 3. Click "OK" for confirmation box		
Lost Case	<u>Archive Lost Case</u> 1. Select "Lost Case" section from homepage 2. Click any archive icon to archive item 3. Click "OK" for confirmation box		
Claim Record	<u>Mark Item Status as "Claimed"</u> 1. Select "Claim Record" section from homepage 2. Click "Claimed" button 3. Click "Yes, the item has been claimed" button		

	<u>Archive Claim Record</u> 1. Select "Claim Record" section from homepage 2. Click any archive icon to archive item 3. Click "OK" for confirmation box		
Item for Sale	<u>Approve Item for Sale</u> 1. Select "Item for Sale" section from homepage 2. Click "Approve for Sale" button 3. Enter starting bid 4. Enter bid end date 5. Click "Submit" button		
	<u>Edit Item for Sale</u> 1. Select "Item for Sale" section from homepage 2. Click edit icon 3. Update new item details		
	<u>Select Bid Winner</u> 1. Select "Item for Sale" section from homepage 2. Click "View all bids" 3. Click icon of winner bid under status 4. Click "Confirm" button 5. Click "Sold" or "No Show" button		
Profile	<u>Update Profile</u> 1. Select "Profile" section from homepage 2. Click edit icon 3. Enter new profile details 4. Click "Submit" button		
	<u>Change Password</u> 1. Select "Profile" section from homepage 2. Click "Change Password" button 3. Enter current password "adminpass" 4. Enter new password 5. Enter confirm password 6. Click "Update" button		

APPENDIX E: User Acceptance Test Case for Student

Testing date			
Testing start time			
Testing end time			
Name of tester			
Test Module	Test Scenario	Pass/Fail	Comments
Register	<ol style="list-style-type: none"> 1. Click "Register" in navigation bar 2. Enter name 3. Enter email 4. Enter contact no 5. Enter password 6. Enter confirm password 		
Login	<ol style="list-style-type: none"> 1. Enter the credentials as below: <ul style="list-style-type: none"> • Email: yting98@1utar.my • Password: 123456 		
Announcement	<u>View Announcement</u> <ol style="list-style-type: none"> 1. Select "Announcement" section from homepage 2. Click any announcement subject to view details 3. Click attachment to view content 		
Item Found	<u>Search Item by Category</u> <ol style="list-style-type: none"> 1. Select "Item Found" section from homepage 2. Click "Show All Categories" button 3. Select any category 		
	<u>Search Item by Date</u> <ol style="list-style-type: none"> 1. Select "Item Found" section from homepage 2. Click first calendar icon and select date 3. Click second calendar icon and select date 4. Click "Search" button 		
	<u>Search Item by Date</u> <ol style="list-style-type: none"> 1. Select "Item Found" section from homepage 2. Select "Search by Keyword" textbox 3. Enter keyword 4. Press "Enter" 		
	<u>View Item Details</u> <ol style="list-style-type: none"> 1. Select "Item Found" section from homepage 2. Click "Details" button 		
	<ol style="list-style-type: none"> 1. Select "Item Found" section from homepage 2. Click "Details" button 3. Click "Claim" button 4. Select claim date 5. Click "Submit" button 		
Claim Item			
Lost Case	<u>Search Item by Category</u> <ol style="list-style-type: none"> 1. Select "Lost Case" section from homepage 2. Click "Show All Categories" button 3. Select any category 		
	<u>Search Item by Date</u> <ol style="list-style-type: none"> 1. Select "Lost Case" section from homepage 2. Click first calendar icon and select date 3. Click second calendar icon and select date 4. Click "Search" button 		
	<u>Search Item by Keyword</u> <ol style="list-style-type: none"> 1. Select "Lost Case" section from homepage 2. Select "Search by Keyword" textbox 3. Enter keyword 4. Press "Enter" 		
	<u>View Item Details</u>		

	<ol style="list-style-type: none"> 1. Select "Lost Case" section from homepage 2. Click "Details" button 		
Report Lost	<ol style="list-style-type: none"> 1. Select "Report Your Lost" section from homepage 2. Enter name 3. Select category 4. Enter description 5. Enter possible location 6. Select date lost 7. Upload image 8. Click "Submit" button 		
Item for Sale	<u>Search Item by Category</u> <ol style="list-style-type: none"> 1. Select "Item for Sale" section from homepage 2. Click "Show All Categories" button 6. Select any category 		
	<u>Search Item by Keyword</u> <ol style="list-style-type: none"> 1. Select "Item for Sale" section from homepage 2. Select "Search by Keyword" textbox 3. Enter keyword 4. Press "Enter" 		
	<u>View Item Details</u> <ol style="list-style-type: none"> 1. Select "Item for Sale" section from homepage 2. Click "Details" button 		
Bid Item	<ol style="list-style-type: none"> 1. Select "Item for Sale" section from homepage 2. Click "Details" button 3. Enter bid amount 4. Click "Bid" button 		
Profile	<u>Update Profile</u> <ol style="list-style-type: none"> 5. Select "Profile" section from homepage 6. Click edit icon 7. Enter new profile details 8. Click "Submit" button 		
	<u>Change Password</u> <ol style="list-style-type: none"> 7. Select "Profile" section from homepage 8. Click "Change Password" button 9. Enter current password "123456" 10. Enter new password 11. Enter confirm password 12. Click "Update" button 		